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Digital transformation of education in the COVID-19 process and its psychological effects on children

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Emrah Soykan, Ayhan Çakici and Mert Bastas

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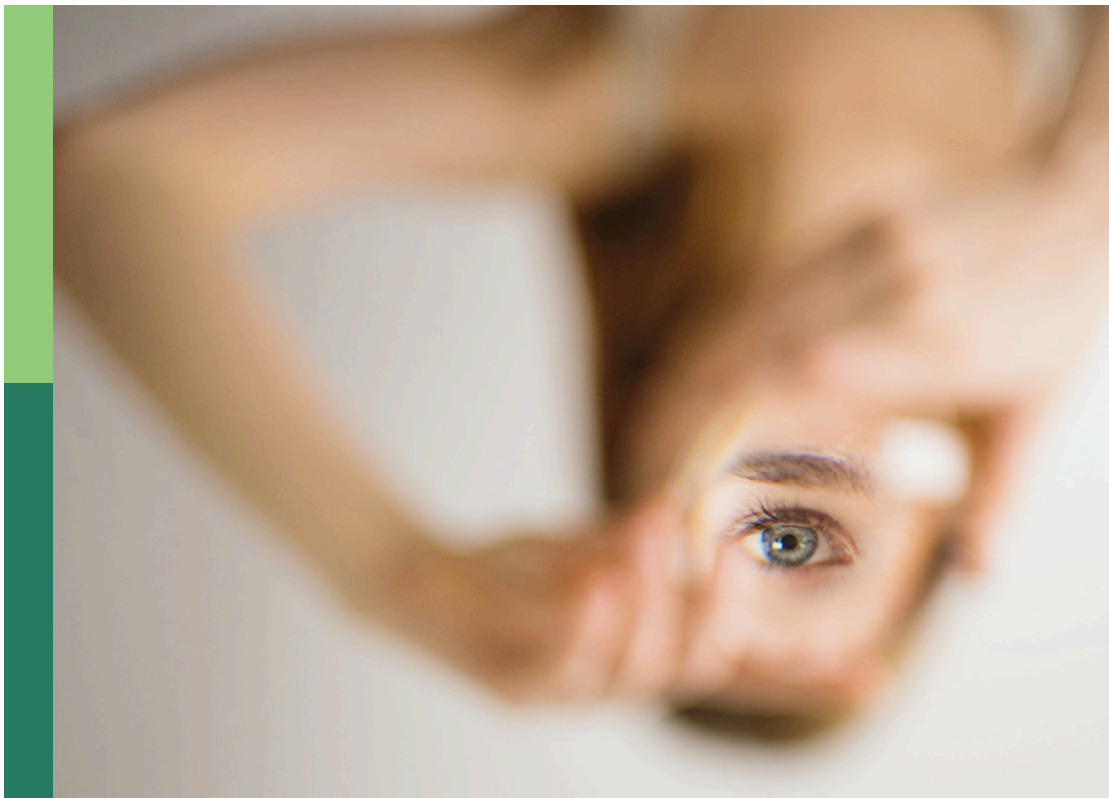

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Digital transformation of education in the COVID-19 process and its psychological effects on children

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Editorial: Digital transformation of education in the COVID-19 process and its psychological effects on children

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Editorial on the Research Topic
Digital transformation of education in the COVID-19 process and its psychological effects on children

Introduction

The declaration of COVID-19 as a pandemic by the World Health Organization (WHO) gave the entire world a clearer picture of the threat posed by the virus to the existence of humanity. The danger posed by this virus cuts across all works of life and geographical borders. Several measures such as physical/social distancing, constant use of masks, washing of hands, and application of hand sanitizers were taken to curb the increasing rate of transfer of this virus from person to person. The field of education cannot be isolated from the sectors affected by the pandemic, causing total physical closure of schools and this resulted in numerous innovative strides by educators, technologists, and all concerned stakeholders. One of these innovative strides was online learning through the digital transformation of education. Distance education, online learning, and remote learning are not novel concepts in education, based on the fact that these concepts have been in existence and in practice prior to the COVID-19 period but not all citadels of learning, educators, and even students supported these concepts due to several reasons such as technology reliance, low motivation, economic factors, etc. However, several scholars have highlighted the merits and potential of these concepts.

The global closure of schools for a long period of time due to the COVID-19 pandemic gave birth to the emergence of various strategies in the quest to continue to support and educate children, and these strategies include the provision of instructional services in-person, distance learning, and various hybrid configurations like remote/distance strategies.

Currently, online education has emerged as a reality for everyone, and the digitalization of the instructional environment has been a challenging process for each and every stakeholder in education making educational psychology integrate all aspects of training, practice, and research as a result of this difficulty. This necessitates the academic discourse that concentrates on psychology and the digital transformation of instructional settings that will incorporate the areas of intervention, assessment, consultation, and other forms of educational service and practices in the foreseeable future.

This collection welcomes articles that addressed emerging and highly significant topics on the changing psychology of children and the digitalization of education. The arguments for and against this digital transformation during the COVID-19 pandemic period seek to contribute to the literature on educational technology and educational psychology. Our Research Topic gathered significant and interesting articles related to documenting the impact of the COVID-19 pandemic on education, and recommendations for solutions with scientific research that are likely to support youth, families, educators, and allied professionals during this unprecedented time. Discussion of new educational technologies and negativistic psychology generated by the quarantined youth are believed to address a wide range of problems that need to be tackled.

The main scope of the collection was basically centered on the digitalization of the school environment and the psychological effects of COVID-19 on children with provisions to attract related articles on the integration of educational data into classrooms, development of modern e-learning systems, flipped classrooms and flipped learning, digitalization of classroom models, educational psychology, effective application of Web 2.0 tools, innovative learning analytics and educational data mining, school psychology, e-reading and importance of technology application in Language learning, and technological leadership. This collection started from the call for articles that lasted for (insert data) months, between (insert day and month) 2021 to (insert day and month) 2022, receiving (insert data) articles, and after a rigorous and constructive review process, (insert data) articles were accepted for publication.

Digitalization for safe school environment, students' financial awareness and financial behavior, and language learning

One of the new significant concepts in education during the post-COVID-19 era is the concept of a safe school environment as a result of the adverse of COVID-19 on education. Technology integration into the teaching and learning process has been highlighted by McBrayer et al. (2020) and Paci-Green etal. (2020) as one of the major avenues to intensify the awareness of the concept of safety in pedagogical practices. Akdag and Altinay evaluated the effects of digital stories in the context of learning-based themes of safe schools and the perceptions of special educational needs in safe school environments by training school administrators (i.e., principals) and teachers-in-charge with educational videos created for the effectiveness of this process which was assessed *via* reflective opinion forms. Findings from the study revealed the need for schools to have satisfactory safe school features and the need for all stakeholders to take proactive measures to promote coordination in creating a safe school environment. Money-related behavior is something most people engage in on daily bases in life, having sufficient financial proficiency becomes a necessity to effectively manage day-to-day financial activities that include the transformation of large or small assets or debts and expenditures but the degree of this financial knowledge probably differs among people. Liu and Lin digitalized an integrated financial education course for 217 students from departments of finance in universities in Fujian through the internet. These students completed this integrated financial education course within 18 weeks, and the results indicated that the digitalization of this course is effective for instructional delivery that circumvents the problems of getting lost in the real-life investment market.

As a result of the COVID-19 pandemic and the swift technological advancement in our contemporary world, the digitalization of education has offered ubiquitous access to educational content irrespective of location and time, and people that are interested in learning new languages but confronted with several challenges such as financial difficulty and the closure of schools during the COVID-19 pandemic have been adopting mobile learning methods. Betoncu et al. developed a mobile application called "YIT101" for teaching Turkish as a foreign language irrespective of location and time, with a focus on basic Turkish A1-level course content. Betoncu et al. study highlighted the topical areas to concentrate on with respect to interaction, usability, and content when creating interactive mobile applications learning Turkish as a foreign language.

Challenges confronted by students, parents, instructors, higher institutions, vocational education training (VET), and early childhood schools during the COVID-19 pandemic

Pradana and Syarifuddin dissected the social issues raised due to a substantial number of school students who do not have access to online learning and teaching facilities during the COVID-19 pandemic period. One of the significant results of a survey conducted by the Indonesian Child Protection Commission (KPAI) on the success of remote learning at home during the COVID-19 pandemic period showed that remote learning challenges should not be overlooked. The weighty pressure put on the people living below the power line as a result of the COVID-19 pandemic has made it difficult for students from low-income earning families to afford digital devices and internet data plans for online education. Pradana and Syarifuddin surveyed the numerous digital learning challenges confronted by students, parents, and teachers during the COVID-19 pandemic period and the findings revealed that government intervention to subsidize internet data subscriptions was not sufficient because most of the participants claimed that they do not have electronic gadgets such as laptops, smartphones, and computers, etc. Only parents that are able to borrow electronic gadgets such as laptops, smartphones, and computers from relatives benefited partially from the government intervention.

Alzadjali et al. assessed the effect of education and institutional management on Vocational Education and Training (VET) schools during the COVID-19 pandemic period with the aim to comprehend the effect of the COVID-19 pandemic

and detect potential constraints that may affect its influence on economic growth using qualitative research method. Hundred and eight VET college students and staff were sampled in this study using interviews and questionnaires and the findings revealed that the administration plays a significant part in economic growth. The students noted that the national educational administration of the government plays an essential part in their education and that this in turn churns out industry-ready individuals who will impact economic growth.

Several empirical studies have concentrated on the evaluation of education's responses to the challenges posed by the global shutdown of schools due to the COVID-19 pandemic as a completely novel state of affairs that has resulted in the global acceptance and spread of remoted education as the only form of teaching and learning platform. instruction. Salakhova et al. focused on presenting the findings of socio-psychological research on educational resources, accessibility, applications, and remote education technologies by collecting data to understand the problems of online education confronted by students of higher institutions of learning during the COVID-19 pandemic era. Using qualitative research method with the assistance of in-depth interviews conducted for 160 students from some higher institutions of learning in Moscow, to dissect their perceptions of remote education. Findings from Salakhova et al. study indicated that technical issues were the major problems of distance education faced by all the students of higher institutions of learning during the COVID-19 pandemic era. These technical issues range from a poor internet connection, unavailability of required facilities for online education, complicated access to remote platforms due to traffic, and unavailability of personalized space for distance education. In addition, the findings also revealed low-quality e-resources, cyber intimidations in remote courses, and pitiable technical readiness on the part of higher institutions of learning during the COVID-19 pandemic era. The hybrid form of education became the preference of a larger percentage of students of higher institutions of learning that participated in this study. The hybrid form of education integrates both the traditional form of instruction (i.e., face-to-face) and remote education.

Like other educational institutions, the early childhood citadel of learning faced profound difficulty in scaling through the COVID-19 pandemic era and the responses to this pandemic have no doubt impacted all segments of daily routine. The agitation for a protracted set of actions has critically affected social relationships and the wellbeing of the people during this unprecedented global state of affairs. Papatzikis stated that early childhood music education is part of the aspects of early childhood education that the pandemic affected and resulted in the digital migration of instructional activities to maintain educational impetus. This early childhood scholar discussed the context of digital presence for the early years music programs during the COVID-19 pandemic period crisis and considered the advantages and character of these unusual settings. Papatzikis concluded by recognizing the debate on the intersecting connection between education, music, mental health, and the pandemic while noting that early childhood educators are thus indebted to infants a well-knowledgeable answer to whether or not (and how) to better attend online early years music education classes.

Application of Sharestart, virtual reality, multimedia audio and video, and online problem-solving instruction to enhance the learning attitude and creativity of students, learning motivation, and self-efficacy advancement for employees

The contemporary popularity of student self-directed learning is covered under the context of the global acceptance of e-learning and remote education platforms offered through digital space. There is a growing substantial percentage of local instructors joining this transformational trend and several teaching methods that guaranteed the acquisition of critical thinking skills by the students can be considered as critical thinking learning, learning by doing, multiple assessments, cooperative learning, and team discussion teaching. Sharestart is an active and immersive teaching method with the objective to foster the abilities of students in self-paced learning through thinking, reading, analysis, discussion, expression, writing, and induction, by emphasizing the return of learning power to the students and injecting the vibrant spring of transformation into the teaching and learning process. Luo et al. evaluated the key factors in the advancement of learning attitude in Sharestart with the expectation to recommend additional positive practice directions for educators planning to adopt Sharestart and give some certain recommendations for the primary movers of Sharestart. The findings of this study indicated that the learner's cognitive adaptation and engagement is the utmost underscored dimension, while professional development of teachers, administration and parental support, and material and teaching strategy followed in sequential order. The leading highlighted indicators are the methodical development of thinking skills and self-paced learning, the building of a professional community for the collaborative lesson study of teachers, the assistance and collaboration of the leaders and the administration, the acceptance of the diverse alliance, and co-learning, cooperative learning, and discussion.

The inquisitiveness and the desire for knowledge by learners should be promoted to assist them to build autonomous thinking skills and problem-solving abilities since problem-solving abilities are a significant part of human life on a daily basis. In combination with active characters and positive attitudes that are required to solve difficulties in the lifecycle of humans and develop self-confidence. Problem-solving abilities that involve creative and critical thinking skills are pivotal and fundamental requirements for humans to generate competitive advantages that can be accomplished through educational goals in a global context. Integration of creativity into teaching should be considered to develop students' creative attitudes and lifelong learning. Wang focused on student creativity and how its influenced by online problem-solving instruction and the identification of attitudes toward instructional strategies with the aim to assist the new generation to develop creativity and rich imagination to integrate the power of technology, nature, and humanities through the lens of quantitative research method, and findings indicated that the new generation needs high levels of support to develop creativity and

combine different subjects like technology, nature, and humanities. To support creativity in the new generation, a rich mind is also required.

The transformational wave in education moves across numerous countries due to the need to improve the human resources essential for national development to deal with changes. Several countries have financed education based on the potential of national education in building a new generation of citizens that will possess the new skills, abilities, and character to handle the likely effects and problems of a new era in the new century. Hsiao applied Virtual Reality to experiential education due to the contemporary recognition of the experiential learning model as alternative teaching and learning movement by non-profit and profit establishments in the education, business, and social workers domain. This study took social workers in southern Taiwan as samples for experimental research and the findings revealed that the application of virtual reality in experiential education will have impacts on self-efficacy and learning motivation. Self-efficacy showed noteworthy positive impacts on learning motivation. The practical implication of these findings is that there is a likelihood of the application of virtual reality in experiential education to enhance relationships among social workers *via* the learning activity and internalize the experience in the practical learning process of problem-solving, interaction, and extrinsic relationships to accomplish a better life.

Huang and Hung investigated the instructional efficacy of multimedia audio and video-integrated pre-service training and the impacts of pre-service orientation training (i.e., education) on organizational identification and self-efficacy advancement using 264 supervisors and employees in the high-tech industry as research samples. Results from this study indicated statistically significant positive impacts of pre-service education on employees' organizational identification and self-efficacy and the impact of employees' organizational identification on self-efficacy advancement was significantly positive as well.

Implementation of risk awareness education and the effect of students' crisis awareness on emotion during the COVID-19 pandemic

The hidden elements in campus safety are growing as a result of social modifications, and addressing these factors has become additionally problematic. Students are saddled with the responsibility of coping with the changes in internal and external environments based on the challenges of a multicultural society. There is a consistent occurrence of new events that might result in campus risk and the recent occurrence of new events on the campus has created problems for school organizational components. This necessitates the implementation of campus risk management strategies and risk awareness education movements. The reality of this technologically dynamic era is another factor that requires risk awareness and appropriate risk management for the justifiable development of organizations and personal existence. Liu et al. discussed the factors in implementing risk awareness education with the hope that school administrators will take charge and limit the prospect of school members being harmed or endangered by the risk factor and that educators will be well-informed in making a swift intervention to upturn risk into opportunities which are the significant roles. The findings of this study revealed life education to be the most highlighted dimension, trailed by curriculum and instruction, and environmental planning. Other most highlighted indicators are physical activity, role-play, opportunity education, learning area planning, and team competition.

The impacts of crises differ among persons, communities, and countries and the same applies to crisis management by governments and non-governmental organizations, particularly with respect to "publicity," because it involves bureaucracy to deal with people's accountability concerns. Yang and Miao examined the connection between students' crisis awareness, trust, and emotions during an epidemic (i.e., a major public health emergency) with a structural equation model (SEM) for statistical analyses. The findings from this study reveal that; people can simply fall into adverse emotions at the epidemic spread stage; communities that boost of a good trust relationship see schools less responsible for perilous occurrences and more supportive of crisis communication; reducing the bad emotions of the public after the occurrence of dangerous events may efficiently diminish the mutilation of dangerous events to the organization. Other factors that can aid students to develop improved trust in school are the protection of school status, avoidance of a loss of student confidence and increasing anger, maintaining a good communication outcome, and lessening the effect of the crisis. In times of crisis within the school, the findings of this study can dimmish the likelihood of learners' displaying bad emotions and spreading rumors.

Conclusion

It is clear that education can be affected by unforeseen external attacks like the COVID-19 pandemic, one major headway is that educators have been furnished with major challenges faced by students and teachers, and the likely solutions *via* technological innovations such "YIT101" for teaching Turkish as a foreign language irrespective of location and time, integration of novel innovations for the advancement of remote education and numerous empirical studies. It is essential that the government of every country should be well aware of the social welfare gap which has been one of the major constraints responsible for the non-affordance of technological devices, internet subscriptions, etc., and efforts should be geared toward the reduction of this gap if not total eradication. This Research Topic has been to provide direction on optimizing the administration of schools, public health, and campus crisis situations and improvement of students' mental health.

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MB and ES wrote the first draft of this editorial. AÇ carried out the supervision and the final edits of the draft. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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BRIEF RESEARCH REPORT
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How Primary School Children Perceive Tolerance by Technology Supported Instruction in Digital Transformation During Covid 19

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Tolerance education started at an early age in primary schools for a multicultural life. Video-based educational applications provide that child actively participate and learn. This study aims to explore perceptions of primary school children toward tolerance by technology-enhanced learning in Covid 19 period. Online semi-structured interview form was used and the data were analyzed with content analysis. Children developed the universal values such as equality, empathy, not harming themselves, being fair, helping others, happiness, smiling, hugging, respecting, giving gifts, loving people and all living beings without discrimination against disability by technological materials and online education. Future of education relies on tolerance education by incorporating universal values.

Keywords: technology, learning, Covid 19 period, digital transformation, tolerance education

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INTRODUCTION

The fact that people live in harmony together evokes the concept of tolerance. As a result of the historical processes from the past to the present, the culture, tradition, thought and behavior styles of societies are changing. Living together in a changing environment in a social sense is possible with the education given to individuals. Tolerance training is necessary for the individual to realize his own limits, to live life in line with his own plans, to be aware of the human need to exist in social life and to direct his intelligence toward good (Chistolini, 2017). UNESCO (1994) emphasizing the importance of tolerance education and conducting studies in this field, expresses tolerance education as the development of the new generation's ability to reach independent judgment, critical thinking and ethical reasoning. Sönmez and Aksan (2019) reveals the boundaries, form and quality of relations between people surrounded by values in social life, while tolerance consists of themes related to religion, racial, politics and culture. Hidayat and Nasution (2020) express the definition of tolerance in their studies as a state of respecting and valuing differences, religious beliefs, and differences of opinion, establishing good relations with people, and being able to behave fairly without prejudice. Miller and Sessions (2005) emphasizes that tolerance is a primary value in achieving serenity and peace in societies with diversity such as religious beliefs, culture, race and gender. Lysenko et al. (2020) tolerance is becoming the most up-to-date problematic of the contemporary world, following the globalization process and crises caused by migration. For this reason, in order to develop tolerance awareness in young generations, it is necessary

to organize educational programs in schools and to equip those who carry out education with sufficient knowledge and skills.

Nowadays, with these advances, students are digital natives, as they master the technology in this process; teachers, on the other hand, are regarded as digital immigrants as they meet technology later (Bittman et al., 2011). It is stated that students experience real life by watching real life, learning activities are high, and individuals can progress at a low cost according to individual differences) with various course materials used within the scope of distance education such as animations, simulations, sounds, images and videos (Kilit and Güner, 2021).

Due to the Covid-19 epidemic, there is a compulsory transition of schools to distance education throughout the world, and it is stated that the participation in the lessons is quite high as a result of the virtual adaptation of technology in the higher education institution in Bangalore and as a result of the students enjoying these experiences (Shenoy et al., 2020). In their work, Akcil and Bastas (2020) point out the importance of digital citizenship, with the transition from face-to-face education to online education during the Covid-19 pandemic process. In their studies with university students, they concluded that the relationship between digital citizenship behaviors and e-learning attitudes, which are effective in learning willingness in positive way. Unwin (2019) discusses the effects of technology use on future education in his study. It is also stated that the digital content and devices used in education will develop in such a way that each student can take responsibility for and control their own learning, and the increasing need for videos will increase as the content gets richer. McKnight et al. (2016) complies with the principles of student-centered education, in which he assumes an active role in student learning, in collaboration to integrate technology into education, to reach up-to-date learning resources, to have diversity in method, and to enable students to be critical thinking, problem solving and creative at the same time.

In this context, it is thought that the use of video in the course content is important for an effective tolerance education in order to conduct the course in a technology-integrated manner and to ensure permanence in learning. In this direction, the feedbacks from students gain importance. The aim of this research is to report students' experiences of using technology-mediated learning applications for tolerance education. The following questions were examined in this study;

1. How do students define the concept of tolerance?
2. What does use of technology-based learning gain students?
3. What are the gains of students in tolerance education with technology supported education?

MATERIALS AND METHODS

This research is a qualitative study conducted to examine the experiences of students and to clarify the use of technology within the scope of tolerance. This research is carried out using phenomenology design. It is a study conducted with phenomenology to reveal the subjective opinions, thoughts and perceptions of the participants about the subject (Schwandt, 2000). The researcher preferred to carry out the applications online with her own classroom due to the fact that she is also a classroom teacher and due to the Covid-19 outbreak. The sample group consists of 17 students studying in class 3 A of the relevant public primary school affiliated to the TRNC MEB in Nicosia in the 2020-2021 academic year. In the study, the student group was chosen in accordance with the "easily accessible case sampling" of the purposeful sampling approach.

The researcher used the interview technique (story telling) or diary, which are among the qualitative data collection methods, to collect the research data. This research consists of two stages. In the first stage, students were presented with a video screening in accordance with the content of tolerance education in the course, which was taught online using Zoom in web-based distance education, and in order to reveal student perceptions on this subject, both focus group meetings were held during the course and online interviews were made with students using a pre-formed semi-structured interview form after the course. Qualitative data were analyzed through thematic analysis. The coding system was used to classify themes. Since the principle of confidentiality was taken into account in the research, while the participants' opinions were included in the findings section, the students were presented in the form of codes S-1, S-2, …

RESULTS

Finding 1: Students' Views on the Concept of Tolerance

Table 1 presents the findings that emerged in line with the data obtained as a result of the interviews with the students. 17 students participated in the study. Participant findings are as follows: Empathy (f: 2), Equality (f: 1), Justice (f: 1), Helpfulness (f: 6), Understanding (f: 2), Respect (f: 8), Affection (f: 6), Being Indulgent (f: 7), Behaving well (f: 14), Respecting differences (f: 2), Generous (f: 1), Nice talk (f: 2), Discreet (f: 1), Honest (f: 1), Calm (f: 3), Give value (f: 2), Happiness (f: 4), Smiling (f: 2). Students put forward 65 different views to express the concept of tolerance.

Most of the students explain the concept of tolerance as "Behaving well." Q-3 *"When we treat our friends well without offending them, they are also happy and they mutually treat us well."* Q-11: "*We should get everyone to play while we are playing at school. For example, if we do not let our friends play, they may cry and get upset. Also, mocking is a very bad thing. I treat my friends well, being nice is a very nice thing."* expressions about behaving well are used.

Another finding is that tolerance is expressed as "being tolerant." Q-14: *"If my friend asks me a lesson that he does not understand, I will tolerate him and help him in his lesson. I speak without yelling at him."*

Regarding the finding on "Respect," Q-2: *"Not all people are the same. Some are music lovers, some are football lovers, people do not necessarily have to do the same hobby. I have to show respect,"* statement is included.

TABLE 1 | Students' views on the concept of tolerance.

Tolerance concept	*F*	%
Empathy	2	3%
Equality	1	2%
Justice	1	2%
Helpfulness	6	9%
Understanding	2	3%
Respect	8	11%
Affection	6	9%
Being tolerant	7	11%
Behaving well	14	21%
Respecting differences	2	3%
Generous	1	2%
Nice talk	2	3%
Discreet	1	2%
Honest	1	2%
Calm	3	5%
Give value	2	3%
Happiness	4	6%
Smiling	2	3%
Total	65	100%

TABLE 2 | Student views on the benefit use of technology-based learning for students.

Contribution of technology-based learning	*F*	%
Positive effect on technology use skill	7	24%
Easier understanding of subjects	5	17%
Lessons becoming interesting	8	28%
Having a fun class environment	6	21%
Being motivating for learning	2	7%
Taking an active role	1	3%
Total	29	100%

Finding 2: Opinions on the Benefit Use of Technology-Based Learning for Students

The findings obtained from the perceptions of the students about the benefit of using technology-based learning are presented in **Table 2**. A total of 29 opinions regarding participant findings are presented as; Positive effect on technology use skill (f: 7), Easier understanding of the subjects (f: 5), Lessons becoming interesting (f: 8), Having a fun class environment (f: 6), Being motivating for learning (f: 2), Taking an active role (f: 1).

From the opinions, it is seen that "lessons become interesting" is the majority. Q-7 *"It was great that the lesson was handled with video. I watched curiously what would happen. I wish all the lessons were taught with video."*

Among the findings, "the positive effect of technology use skills" is one of the opinions agreed. Q-8: *"We used to teach our lessons in the classroom before, but if it is, we do lessons on the tablet. We use technological things we haven't used before, we learn new things. I used to only use my tablet to play games."*

TABLE 3 | Students' views on technology-supported teaching and achievements in tolerance education.

Technology-supported education and achievements in tolerance education	*F*	%
Positive contribution to academic development with regard to tolerance	11	50%
Enables students to interact with regard to tolerance	3	14%
Raising awareness on tolerance	6	27%
Preparing students for social life with regard to tolerance	2	9%
Total	22	100%

Finding 3: Technology-Supported Education and Students' Views on the Achievements in Tolerance Education

In **Table 3**, the opinions of the participants regarding the use of technology-supported education in tolerance education are presented in the form of themes. Findings of participant; Positive contribution to academic development with regard to tolerance (f: 11), Enables students to interact with regard to tolerance (f: 3), Raising awareness on tolerance (f: 6), Preparing students for social life with regard to tolerance (f: 2) and 22 topics are presented. The most common statement is about the theme "positive contribution to academic development with regard to tolerance." Q-5: *"The video I watched impressed me… I realized how important it is to be tolerant and understanding, respecting the disabled and everyone."*

Regarding the theme of "raising awareness on tolerance," Q-12: *"I did not know what tolerance was before. We have to show respect to my friend, whether he/she is successful or not at mathematics, and everyone who is dark or light in skin color."*

DISCUSSION

In this study, when the findings obtained on how technology-enhanced learning improves students' skills in tolerance education, students defined tolerance as follows: Empathy, Equality, Justice, Helpfulness, Understanding, Respect, Affection, Being Indulgent, Behaving well, Respecting differences, Generous, Nice talk, Discreet, Honest, Calm, Give value, Happiness, Smiling. It is seen in the study of Kaygısız (2019) that similar findings were obtained in the form of loving, being respectful, sharing and doing good. In another study, Aslan (2019) reveals the perceptions of primary school 4th grade students within the framework of tolerance and respect, and the findings are similar to helping and sharing based on love and respect. In Aslan and Aybek (2020) studies, it is similar to this study in terms of students' perception about tolerance which suggests that in order to be tolerant, it is necessary to be helpful, respectful and not to break anyone's heart. Ersoy (2016) explains that students perceive tolerance as helping, loving and behaving well. Wainryb et al. (2004) found in their study on children in the first childhood period that the level of tolerance was low as the age got smaller. Tillman (2000) shows that increasing violence and social problems in children stem from lack of respect and tolerance, and studies show that the most effective

way for parents and educators to cope and overcome with these problems is to teach values. Lazovsky (2007) concludes that the participants' communication skills such as showing respect for their thoughts and expressing their feelings to a person who is not of the same opinion can improve.

The findings obtained from students' perceptions about the benefits of using technology-based learning are presented under themes such as the positive effect of the technology use skill, the easier understanding of the subjects, the engaging lessons, an entertaining lesson environment, being motivating for learning, and taking an active role. With the use of technology in tolerance education and the presentation of the lecture in which the audibility and visuality in the videos are added, the attention and interest of the students becomes more intense during the lesson and it is seen that the learning is more permanent. Kenar (2012) indicated that pictures, sound, animation and video in multimedia presented in teaching are beneficial in permanent learning, as they affect many senses. In another study, Levy and Yupangco (2008) stated that the materials used in teaching have a positive effect on learning since they are effective on visual perception. In the study of Demuyakor (2020), it is found that students in higher education institutions perceive the course content for online learning as effective and useful during the Covid-19 process, and they are also satisfied with the use of materials such as texts, software and videos recommended by the teacher. Özmen (2004) stated in his study that the use of technological tools in the lesson increases the interest of individuals in the lesson, motivates them and creates permanent behavioral changes, and that it will be beneficial to get help from technology in the lesson to bring back the old information in the memory. In Taşlibeyaz (2019) study, it is concluded that video blogs attract students' attention to the lesson and facilitate learning.

In this study, students' opinions revealed by using technology-supported teaching in tolerance education under main topics as follows; positive contribution to academic development on tolerance, enabling students' interaction with regard to tolerance, raising awareness about tolerance, and preparing students for social life with regard to tolerance. Eryilmaz and Salman (2014) stated that according to student perceptions, content such as videos, animations and e-books used in e-content facilitates learning and increases success. In Coşkunserçe (2020) research, it is pointed out that the lesson becomes interesting and fun and the participants develop a positive attitude toward values education by using video blogs in values education. It was also stated that these positive attitudes indicate that the course is successful. Basar and Cangal (2021) states that, with the use of new technologies in teaching, the teaching process will provide students with permanent learning and student success will increase.

In this study, students' views on tolerance provide a universal insight with their expressions such as equality, empathy, not harming themselves and world, being fair, helping others, happiness, smiling, hugging, respecting, giving gifts, loving people and all living beings without discrimination. In addition, it is concluded that the participants can take on a more active role while learning thanks to the technological materials used in the lesson, that the use of technology improves their skills, they grasp the subjects more easily, they take an attractive and active role in the lesson, and they are motivated to understand the concept of tolerance with a cooperative and entertaining lesson environment.

Education systems around the world are beginning to be insufficient to address the situations that arise in the face of globalization and technological innovations. Increasing population mobility, increase in the number of immigrants and refugees create diversity in students. Social exclusion and marginalizing behaviors among students that emerge in this situation constitute a problem of tolerance. In order to overcome these problems, education can help students prepare for social life and gain competence in cultures (Isac et al., 2018). Tolerance awareness can be gained through education at schools. In schools, four basic ways are suggested for students to be informed about tolerance and to develop attitudes. These four ways as explained as cognitive complexity, communication with others, socialization of values and identity formation (Janmaat et al., 2018). Aydin and Gürler (2014) state that it is not enough for individuals to only achieve academic success today, but also that it is necessary to acquire behaviors and skills that are important in social life. They that these behaviors and attitudes that they cover many issues as being honest, showing respect and love, sharing, establishing healthy communication, being attentive in their relationships, adopting the rules of courtesy, not being biased, being able to cooperate, being disciplined at work, and avoiding violence.

Bilgin et al. (2018) stated that the transfer of tolerance in families and schools, which form the basis of society, is realized through communication. According to the data obtained, they concluded that communication within the family affects tolerance and is effective in the democratic development of the school and society. Therefore, in order to create tolerance awareness with the participation of families, benefits can be gained by integrating technology and organizing online seminars.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary files, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Near East University Ethical Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

ÖS conceived of the study, participated in the design, data collection, analysis for the study, and drafted the manuscript. FA, MA, and GD participated in its design, data collection, and contributed to drafts of the manuscript. All authors read and approved the final manuscript.

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The Struggle Is Real: Constraints of Online Education in Indonesia During the COVID-19 Pandemic

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Keywords: education, COVID-19, Indonesia, policy, school

INTRODUCTION

The COVID-19 pandemic has forced millions of Indonesian children to shift their educational situation from offline to online (Wiguna et al., 2020). Around 60 million primary to upper secondary school students and eight million vocational school students have to study at home and rely on online technology since the government decided that schools are indefinitely closed (JPNN, 2020). However, social problems raised since a significant percentage of school students do not have access to online teaching and learning facilities (Wahyono et al., 2020).

Ministry of Education and Culture of Indonesia has prepared for the scenario to study online until the end of 2020 (Pradana et al., 2020). However, the infection number keeps rising, and per December 2020, Indonesia is now among the top 20 countries with the highest numbers of cases (around 650,000 cases). Hence, there is a high probability that schools are closed until mid-2021.

There is already some talks of government plans to reopen schools and start face-to-face learning in 2021. Parents are given the option to choose whether they want their children to participate in this face-to-face learning activity. In its implementation, local governments, schools, and parents will be given full authority. However, health researchers, such as epidemiologists, argue that this decision is counter-productive in limiting the coronavirus's spread (Viner et al., 2020).

The positivity rate is the first reason why it is still unsafe to reopen schools in Indonesia. It is relatively safe to reopen schools when the positivity rate is at least 5 percent or below (WHO, 2020). However, Indonesia's positivity rate test is still above 10 percent until December 2020, which shows the severity of COVID-19 pandemic in this country (Wiguna et al., 2020).

STRUGGLES OF STUDENTS AND THEIR PARENTS

On the other hand, there is a necessity to organize classroom learning for students who have difficulty accessing digital learning facilities during the Coronavirus pandemic. A significant number of Indonesian students face the problems of not having cell phones or being unable to buy internet data plan to access the internet. The effectiveness of online education at home during the COVID-19 pandemic period has been monitored by the Indonesian Child Protection Commission (KPAI). According to a survey conducted by the commission in 34 provinces of Indonesia, online learning constraints are becoming a serious consideration (Satryo, 2020).

The Coronavirus pandemic has put heavy pressure on groups of society who live under poverty. When teaching and learning activities cannot be face-to-face, children from low-income families do not have the facilities to access digital learning. Indigent parents have difficulties in affording cellular credits, let alone buying internet data plans. Since the middle of 2020, the ministry of education distributed subsidies in the form of internet data plans. However, it was not a sufficient answer to the problems of online education (Fakhri et al., 2020).

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We also conducted short social survey on 1,700 school students and their parents as respondents. The survey focused on several constraints in carrying out online learning process during the coronavirus pandemic. We distributed the questionnaire in Indonesian main islands, which are also the most populated (Java, Sumatra, Kalimantan, Sulawesi, and Papua). However, due to limited time and budget, we only managed to distribute the survey online. To make sure that respondents from each island represent the population, we distributed the survey proportionally from the most populated island (Java) to the least populated one (Papua).

The result showed that most students or the students' parents complain about the internet data plan subsidy, which is not evenly distributed to Indonesia's rural areas. There was 43 percent of total respondents complaining about that constraint. Other 29 percent of the respondents explained that the subsidy was of no use for them since they do not have computers, laptops, nor smartphones. This group of parents rely on laptops or smartphones that they borrow from families or relatives. The rest, around 18%, are those who do not have everything. We should also consider that around 70% of the respondents complain that they keep having internet connection problems.

STRUGGLES OF THE SCHOOL TEACHERS

The previous section recognizes the main problem that online education cannot be equally applied in all parts of Indonesia. For dealing with these issues, several teachers have been taking the initiatives to come to their students' homes and carry the learning process in groups with a maximum of five students (Taufiqurrahman, 2020). These teachers agreed that online learning online at their places did not go smoothly. The reason they often faced is that many students do not have smartphones or other required gadgets. They also had difficulty controlling the activities of students since they did not have classroom interaction (Wahyono et al., 2020).

At the students' residences, the visiting teachers realized that there are many parents who do not have personal computers, laptops or smartphones. Those who do are facing difficulties in purchasing internet data packages and acquiring decent internet signals. Therefore, it has now become common that teachers, especially in underdeveloped villages, decided to visit their students' homes one by one and bring various kinds of books for the students to read and study (Wahyono et al., 2020).

All of the situations we depicted in this essay are bitter reality. It is obvious that we are still unable to predict the end of the pandemic, but education cannot be postponed. The Indonesian government should be more aware about the gap in social welfare of Indonesian society and focus on specific solutions on the mentioned constraints of online education.

AUTHOR CONTRIBUTIONS

MP and SS wrote the manuscript together and approved the submitted version.

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BRIEF RESEARCH REPORT
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Effects of the Application of Information Technology to E-Book Learning on Learning Motivation and Effectiveness

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Along with the rapid development of electronic technology, the appeal of information technology to students and teachers in domestic and international information education has become universal. Education-related departments aim to positively cultivate the professional information knowledge and skills of teachers. The use of information technology in instruction allows students to enhance their creativity and learning motivation. A total of 232 college students from Fujian Province participated in the experimental research. The results show the following: (1) the application of information technology to e-book teaching could enhance a sense of achievement of students in self-directed learning, and students could answer test questions in a confidential and relaxed manner; (2) the application of information technology to e-book teaching activates teaching flexibility, and many teaching models, such as teaching by wandering around, interactive teaching, and blended teaching, are therefore derived to enhance the richness of teaching; (3) the application of information technology to e-book teaching bridges the distance between instructors and students and leads to a deeper understanding of learning conditions of students, expanding the possibilities for content planning and teaching models. The results give rise to suggestions enhancing enjoyment in learning and promoting higher motivation and more effective teaching.

Keywords: information technology, ebook teaching, learning motivation, learning effectiveness, extrinsic orientation

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INTRODUCTION

The rapid evolution of mobile information technology and multimedia technology results in diversified teaching models for information education. The advance of mobile information technology changes traditional fixed-point teaching to a mobile learning situation. Mobile learning is the learning method allowing learners to acquire information or knowledge through mobile devices and the internet without being restricted to time and space. It allows learners to get rid of the limits of time, space, hardware, and platform, and the characteristics of rapid and easy access to global information have the integration between multimedia materials and tools present better interactivity and mobility to further provide an open and timely system with learner-centered and learner-controlled learning situation (Lin et al., 2017). Instructors teaching or inspecting students can enhance immediate interactions and improve the concentration of students. Multimedia

technology drives e-book integrated learning, and e-books can include multimedia audio and visual effects, thereby enhancing information education. The rapid development of computer technology means that "books" are presented in new ways. A simple key command calls up an "e-book" with the desired information, containing not only text and symbols but also offering the possibility of beautiful music and rich and complex images and animation effects. Textbooks of students have become e-books, and future textbooks will be published electronically.

Domestic and international information education follows the rapid development of electronic technology. There is a consensus among students and teachers on the appeal of information technology. Education-related departments have begun cultivating professional information knowledge of teachers, enabling teachers to work remotely with students. The widespread application of technology means that modern students are accustomed to electronic information and audiovisual stimulation and are ready to adapt their learning styles and needs to the digital age. The change in learning styles from static to dynamic means that teaching models now involve information equipment. E-books, in particular, are attractive because they offer the advantage of multimedia audio and visual effects. However, research on reading motivation, exploring the enhancement of motivation by using information technology in the form of e-book learning, has been rare. Accordingly, the present research examines the effect of the application of information technology to e-book learning on learning motivation and effectiveness. It is expected that the use of information technology in e-book learning could enable students to access information and that creativity and learning motivation will be enhanced.

LITERATURE REVIEW AND HYPOTHESES

Leong et al. (2019) described e-books as the combination of images, sounds, storage media, an interface, and editing software. When used as part of a planned teaching design, e-books enlarge the learning window due to the interaction of senses of the learners. Such interactions can help learners to understand and can establish the concepts of the knowledge to be taught. The effect is more efficient than traditional teaching media and can better enhance the motivation of learners and interests. Ali (2018) compared e-books with paper books and indicated that e-books outperformed paper books on presentation patterns, number of users, sensory learning, material attributes, evaluation feedback, costs, and searchability. Therefore, the application of e-book integrated learning with lively and diverse materials (images and sound effects) could enhance the learning motivation and learning effectiveness of students. Khamis (2019) regards e-books as an interactive medium that is unlike paper as a medium. The text, sounds, images, and video elements present specific content in a dynamic, multimedia manner that breaks away from traditional paper or audible books. Accordingly, the following hypothesis is proposed.

H1: Using information technology for e-book learning would affect learning motivation.

Saini and Kaur (2019) pointed out that the interaction in e-books is not simply the interaction between students and e-books. It can include two-way communication between teachers and students. In interactive learning, teachers and students can communicate opinions bilaterally. Teachers can easily give timely guidance, making students more likely to pay attention than in general teaching and enhancing the effectiveness of learning. This is a big advantage of interactive learning. Baharuddin and Hashin (2020) stated that e-books could offer students diverse learning situations, which, in comparison with general teaching, could better enhance self-directed learning and reading motivation of students, provide interaction experience between students and media, enhance logical thinking and integration ability of students, and allow students to learn with their senses (sight, hearing, and touch). The authors found that e-books enhance learning comprehension, the construction of learning strategies, and the promotion of learning achievement. Phadung and Dueramae (2018) showed that e-books, including animation, allow students to specify abstract concepts. E-books offer clear and easily accessible explanations of events and phenomena, allowing students to understand the background to events and enhancing their investigative abilities. The teaching content becomes rich and diversified, allowing for closer interaction between teachers and students, the enhancement of student participation in the learning process, the achievement of targeted learning through repeated practice, and the promotion of learning effectiveness. Consequently, the following hypothesis is proposed.

H2: Using information technology for e-book learning would affect learning effectiveness.

Yee and Zainuddin (2018) identified a positive effect on the learning motivation and learning effectiveness of students. Elenein (2019) proposed that enhancing the learning motivation of students could significantly promote the learning effectiveness of students. Interested students would understand and participate in learning activities with a positive learning attitude. Teaching plans should take the learning motivation of students into account and optimize factors in the learning motivation of students to enhance learning motivation and effectiveness. Rachels and Rockinson-Szapkiw (2018) considered that students with high learning motivation present more clearly defined goals and a strong desire to learn the content well. They have higher expectations for results and better self-effectiveness. Sritharan (2018) found better performance among students with high learning motivation and better performance among students with intrinsic motivation than among those with extrinsic motivation. As a result, the following hypotheses are proposed.

H3: Learning motivation reveals significant and positive effects on learning effect in learning effectiveness.

H4: Learning motivation shows remarkable and positive effects on learning gains in learning effectiveness.

METHODOLOGY

Measurement of Research Variables

Learning Motivation

Referring to Huang and Chang (2019), learning motivation is divided into intrinsic orientation and extrinsic orientation.

Learning Effectiveness

Referring to Chang et al. (2019), learning effect and learning gains are utilized in this study.

Research Subject and Sampling Data

A university in Fujian Province was selected as the research object. A total of 232 students participated in the 16 weeks (3 h per week for a total of 48 h) experimental research on the application of information technology to e-book learning. SPSS was used to analyze the data, and factor analysis and reliability analysis, regression analysis, and ANOVA were applied to test the hypotheses.

Analysis Method

Analysis of variance was applied to identify the difference in using information technology for e-book learning in learning motivation and learning effectiveness. Regression analysis was applied to identify the relationship between learning motivation and learning effectiveness.

RESULTS

Effects of the Application of Information Technology to E-Book Learning on Learning Motivation and Learning Effectiveness

(1) Difference analysis of using information technology for e-book learning in learning motivation

Analysis of variance was used to discuss, analyze, and explain the difference in learning motivation between the application of information technology to e-book learning and traditional teaching methods using paper books. The results in **Table 1** show that information technology for e-book learning (4.13) appears to have a higher intrinsic orientation than traditional teaching with paper books (3.75), and information technology for e-book learning (4.34) reveals higher extrinsic orientation than traditional teaching with paper books (3.69). Therefore, H1 is supported.

(2) Difference analysis of using information technology for e-book learning in learning effectiveness

Analysis of variance was applied to discuss the difference in using information technology for e-book learning in learning effectiveness, i.e., analysis and explanation of the application of information technology to e-book learning and traditional teaching with paper books. **Table 2** shows a higher learning effect of the application of information technology to e-book learning (4.07) than traditional teaching with paper books (3.51) and higher learning gains of using information technology for e-book learning (4.26) than traditional teaching with paper books (3.84). Therefore, H2 is supported.

TABLE 1 | Difference analysis of using information technology for e-book learning in learning motivation.

Variable		F	*P*	Scheffe *post hoc*
Using information technology for e-book learning	Intrinsic orientation	29.634	0.000**	E-book (4.13) > paper books (3.75)
	Extrinsic orientation	25.377	0.000**	E-book (4.34) > paper books (3.69)

***p < 0.01.*

TABLE 2 | Difference analysis of using information technology for e-book learning in learning effectiveness.

Variable		*F*	*P*	Scheffe *post hoc*
Information technology for e-book learning	Learning effect	23.962	0.000**	E-book (4.07) >paper books (3.51)
	Learning gains	31.451	0.000**	E-book (4.26) >paper books (3.32)

***p < 0.01.*

TABLE 3 | Analysis of learning motivation and learning effectiveness.

Dependent variable→	**Learning effectiveness**			
Independent variable↓	**Learning effect**		**Learning gains**	
Learning motivation	**β**	***P***	**β**	***P***
Intrinsic orientation	0.215	0.000***	0.239	0.000***
Extrinsic orientation	0.247	0.000***	0.224	0.000***
F	18.631	27.384		
Significance	0.000***	0.000***		
R^2	0.269	0.304		
Adjusted R^2	0.242	0.274		

****p < 0.001.*
Data source: self-organized in this study.

Correlation Analysis of Learning Motivation and Learning Effectiveness

Correlation Analysis of Learning Motivation and Learning Effect

The analysis results in **Table 3** reveal notable effects of intrinsic orientation ($\beta = 0.215$, $P < 0.001$) and extrinsic orientation

($\beta = 0.247$, $P < 0.001$) on learning effect. Therefore, H3 is supported.

Correlation Analysis of Learning Motivation and Learning Gains

Table 3 shows significant effects of intrinsic orientation ($\beta = 0.239$, $P < 0.001$) and extrinsic orientation ($\beta = 0.224$, $P < 0.001$) on learning gains. Therefore, H4 is supported.

DISCUSSION

In the application of information technology to e-book learning, the one-to-one computer screen could more easily induce learning interests and attention of students. The specific animation and audio allow students to clearly understand theoretical concepts. The presentation of e-books could better enhance the thinking and critical ability of students. Furthermore, the diversified extension activities, compared to traditional homework assignments, are more acceptable for students, thereby enhancing the integration of theoretical concepts (therefore, teachers could increase the unit and time with the integration of ebooks to specify the parts which are not easily presented with textbooks. It could develop the effectiveness of ebooks, and the timely integration of multimedia information technology into teaching shows positive effects on learning motivation and learning effectiveness of students). Teachers could make use of suitable e-books and could integrate multimedia information technology into their teaching. This would bring about positive effects on learning motivation and the learning effectiveness of students. Teaching with materials closely related to the life of students could make the information more acceptable to students. Teachers, in the teaching process, should familiarize themselves with the e-book content and the related knowledge. They should control the time spent on working with e-books and should interact and discuss with students in a timely manner. They should avoid long e-book reading sessions that might result in learning pressure on students (In the interactive discussion between teachers and students, it is necessary to give sufficient time for students to discuss and think about teaching contents; the next part of ebook teaching should be played after full understanding of students. In the interactive discussion, teachers should timely guide changing virtual situations in ebooks into real knowledge situations for students, or, with the multimedia production ability, present the illustration of important knowledge in ebooks with special effects, or assist with authentic pictures or texts to have students clarify correct scientific knowledge and prevent students overly personifying scientific knowledge). In addition, teachers, in the interaction process, should encourage students at appropriate times to present personal ideas, and they should encourage students to engage in critical thinking and questioning about e-books.

CONCLUSION

The research findings show that students in the experimental group, starting from pieces of ideas on theoretical concepts and moving to more complete ideas, could eventually apply their skills to theoretical concepts in a flexible manner. Theoretical concepts of the students are shown to be enhanced. Therefore, teaching using the application of information technology to e-book learning is specific and effective and could enhance the theoretical concepts of students. As a result, it is practicable and effective for teachers to apply information technology to e-book learning and to use lively animation with audio and music to attract the attention of students. Not only could this process enhance the learning attitudes of students and the nature of their learning, but it could also have positive effects on learning achievement. In the comparison between the experimental group and the control group, the former appears to have a significantly higher average score on learning motivation, learning essence, and learning achievement than the control group. This research shows that the application of information technology to e-book learning causes it to outperform traditional teaching with paper books in terms of effective teaching.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The present study was approved and conducted in accordance with the recommendations of the ethics committee of the Hangzhou Vocational and Technical College, China, with written informed consent being obtained from all the participants. All the participants were asked to read and approve the ethical consent form before participating in the present study. The participants were also asked to follow the research guidelines as set out in the consent form.

AUTHOR CONTRIBUTIONS

All authors revised and approved the submitted version of the manuscript. LS performed the initial analyses and wrote the manuscript. CP assisted in the data collection and data analysis. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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Discussion of Students' E-book Reading Intention With the Integration of Theory of Planned Behavior and Technology Acceptance Model

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The emergence of e-books with the characteristics of easy access and reading any time anywhere is a subject of debate in academia. Topics include the use of e-books in libraries, their use in support teaching, new possibilities for reading activities, potential uses for library archives, and the motivation and intention of e-book users. Students at Guilin University of Technology participated in a survey. Of the 300 copies of the questionnaire distributed, 263 valid copies were returned, a retrieval rate of 88%. The research results show that (1) Usability and reading need are the key factors in e-book usage. Usability refers to convenient keyword searches, portability, and any time reading. E-books are considered to make searching and reading large amounts of data easier. (2) E-books are not restricted to time and space so that the overall reading quantity is increasing. Readers become accustomed to reading e-books, and the quality of their digital reading is gradually enhanced. (3) Students should complete e-book use courses offered by libraries to enhance their familiarity with e-books and their use of e-book software, thereby enhancing postgraduate student readers' e-book information literacy. The results of the research prompt suggestions to enhance the promotion of reading and e-book information to encourage student readers' e-book reading intention.

Keywords: theory of planned behavior, technology acceptance model, e-book, reading intention, behavioral intention

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INTRODUCTION

In the rapidly developing information era, the value of e-books gradually became apparent. The portability of e-books has been an attraction ever since their first appearance. In the field of library and information science, e-books were much discussed. Some argued that e-books should not only be used in the library but should also enhance the services that libraries provide and should be used to support teaching. Susantini et al. (2021) mentioned that it was remarked that e-books can be a new approach to reading and can change how and when people use libraries. As digital publishing expanded, libraries began to acquire significant amounts of digital products allowing users to search digital documents in a convenient and suitable manner. Almost not a country or region in the world could escape from the pandemic of Novel Coronavirus (COVID-19). The pandemic results in major changes in human life to change life and learning styles. Mass or national

school closure is preceded in many countries or regions this year in order to reduce the spread of COVID-19 (Viner et al., 2020). To cope with the pandemic, the approach of "Learning never stops" allows students continuing the learning with the minimal impact. Nevertheless, in face of the menacing pandemic, most teachers passively adopt distance courses without advance warning or enough time for preparing courses (Almekhlafi, 2021). Although distance education presents various advantages and is limited to time and location (Karakoç Öztürk, 2021), the practice of distance education is the maximal transformation. A lot of countries in the world, and even schools, temporarily practice or promote distance education. It would have the frontline teachers and students face some problems or difficulties. Current academic discussions on temporary promotion of distance learning are limited, while the use of e-books is inevitable for the promotion of distance education. The rise in digital publishing led to a situation where there are more e-books than printed books (Erkayhan and Ulke, 2017). This fact is challenging for libraries, especially university libraries, where a gradual transition occurred from paper-based collections to digital resources. Users of university libraries tend to have specific needs, and building a suitable collection can be difficult. Although libraries have started to value the development of their digital collections, they lack information on readers' acceptance, requirements, usage time, and reading habits. They are unsure if readers will change their reading habits and their requirements for printed books after e-books have been introduced into libraries. This is an area worthy of discussion when libraries are compiling their collections. Therefore, the integration of the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM) was used in this research to investigate students' reading intention toward e-books. Understanding how readers use the collections in the libraries and assessing how their expectations are being met might improve students' reading literacy of printed books and e-books. New insights could help to promote students' reading services.

LITERATURE REVIEW

Digital Reading Behavior

In their survey of digital reading behavior, Huang and Chang (2019) found that frequent e-book reading locations included rooms at home, especially the living room, offices, schools, and on transport to work. In different situations, the most common types of e-book reading were: "business and finance," "literature and fiction," "tourism and sport," "lifestyle and hobbies," and "fashion and entertainment." While at home, readers mainly read e-books on tablets, and they use smartphones while commuting. Regarding reading habits, 60% of respondents read 1–4 e-books a month, and about 50% of respondents read e-books for an average of 16–30 min each time. In the survey, more than 70% of the respondents were satisfied with their e-book reading experience. Leong et al. (2019) discovered that most readers read e-books on tablets, read at home, and read every week and that reading methods depend on the type of books. In terms of the effect of e-books on readers, readers' knowledge of e-books was related to the reading experience. Readers favored the convenience of e-books, but they were used to reading paper books. Ease of use of software and hardware and readers' reading habits were the key factors in reading intention. Reading e-books changed reading habits, such as searching for books, type of reading material, time spent reading, note-taking habits, frequency of repeated reading, and book sharing behavior. Readers' problems with e-books included installation, searching, and reading, with searching as the biggest problem. Readers' needs for e-books resulted in bigger collections and longer recommendation book lists. The need arose for reading software to improve searching and personalization.

Application of Model

Kaushik and Rahman (2017) revealed that the use of the TAM to predict users' behavioral intention in using new technologies and their real-use behavior was supported by a significant body of empirical research. However, two factors, the social factor and the controlling factor, which were proven to significantly affect users' real-use behavior with new technologies, were not included in the model. These two factors were the key variables in the TPB. Wei et al. (2017) integrated the TAM and the TPB, including a subjective norm and perceived behavioral control in the TAM, proposing a combined TAM and TPB (C-TAM-TPB), and they conducted empirical research on students' use behavior of computing resource centers.

The empirical results of the study by Lee and Cranage (2018) revealed that the C-TAM-TPB, integrating the TAM and the TPB, presented a high level of fit in explaining users' use behavior with new technologies. Moreover, the group analysis of users with different use experiences revealed that C-TAM-TPB presented a good fit for users with or without experience. Therefore, in this study, TPB and TAM are integrated to discuss students' e-book reading intention.

Research Hypothesis

Lee (2017) stated that Davis included the belief—attitude—intention—behavior relation in the theory of reasoned action in the TAM and particularly emphasized the importance of "perceived usefulness" and "perceived ease of use." Davis considered that information technology with higher ease of use in situations with comparable tasks could assist an individual in completing more tasks in the same time, further enhancing individual work performance. In this case, the perceived ease of use could reinforce the perceived usefulness to the individual of information technology. Stouthuysen et al. (2018) mentioned that Davis also considered that users might have a negative attitude toward specific information technology but would still be willing to use the technology when its use is perceived to enhance personal work performance. Ko (2017) indicated that perceived usefulness could indirectly affect the use intention of information technology through attitude and could directly affect the behavioral intention of users. Furthermore, in addition to perceived usefulness and perceived ease of use as major factors in the attitudes of users toward information technology, attitudes would further affect the behavioral intention of users, thereby determining the acceptance and use behavior of information technology.

The following hypotheses are therefore established in this study.

H1: Perceived ease of use presents positive and direct effects on perceived usefulness.
H2: Perceived ease of use shows positive and direct effects on attitude.
H3: Perceived usefulness reveals positive and direct effects on attitude.
H4: Perceived usefulness shows positive and direct effects on behavioral intention.
H5: Attitude shows positive and direct effects on behavioral intention.
H6: Subjective norm reveals positive and direct effects on behavioral intention.
H7: Perceived behavioral control shows positive and direct effects on behavioral intention.
H8: Perceived behavioral control presents positive and direct effects on behavior.
H9: Behavioral intention reveals positive and direct effects on behavior.

METHODOLOGY

Conceptual Structure

The integration of the TAM and the TPB is used to construct the model in this study, as shown in **Figure 1**.

Research Subject and Analysis Method

Five hundred copies of a questionnaire were distributed to university students in Guilin, China. A total of 433 valid copies were returned, a retrieval rate of 87%. AMOS software was used as the data analysis tool to evaluate students' e-book reading intention.

RESULT

Confirmatory Factor Analysis (CFA) results show that convergent validity in the observation model could observe the suggested reliability value of individual observed variables, construct reliability (CR), and average variances extracted (AVE), where the reliability of individual observed variables is suggested as higher than 0.5. The factor loadings of various observed variables in this study are higher than the suggested value. A CR value of higher than 0.6 is preferable, but some researchers suggest that it should be higher than 0.5. The estimation result of the model shows that the CR is higher than 0.5. The average variance extracted should be higher than 0.5. The average variance extracted of dimensions in this study is higher than 0.5, conforming to the suggested value.

The estimation results of the structural equation are shown in **Table 1**. First, the suggested standards for X^2/df, RMSEA, GFI, AGFI, RMR, and NFI are $\leqq 5$, $\leqq 0.08$, $\geqq 0.9$, $\geqq 0.9$, $\leqq 0.05$, and $\geqq 0.9$, respectively. The values in this study appear as $X^2/df = 3.134 \leqq 5$, RMSEA $= 0.034 \leqq 0.08$, GFI $= 0.968 \geqq 0.9$, AGFI $= 0.925 \geqq 0.9$, RMR $= 0.03 \leqq 0.05$, and NFI $= 0.942 \geqq 0.9$, revealing good overall fit. As a result, the estimation results of the structural equation (**Table 1**) show that all parameters achieve the significant standards ($p < 0.05$).

From the above estimation results of the structural equations, the following seven research hypotheses in this study are supported: H1: Perceived ease of use presents positive and direct effects on perceived usefulness; H2: Perceived ease of use shows positive and direct effects on attitude; H3: Perceived usefulness reveals positive and direct effects on attitude; H4: Perceived usefulness shows positive and direct effects on behavioral intention; H5: Attitude shows positive and direct effects on behavioral intention; H6: Subjective norm reveals positive and direct effects on behavioral intention; and H7: Perceived behavioral control shows positive and direct effects on behavioral intention.

DISCUSSION

Most e-books are free and easy to access. Therefore, students tend to read quickly and to immediately reject unsuitable e-books and to search for the next one. In the reading process of acquisition and searching, e-books usually show an abstract on the interface indicating the content and facilitating the elimination of unsuitable books or articles. Printed books do not often show abstracts, and the content is only indicated by the cover. Students appear to have a higher acceptance of e-books and to have definite reading goals, thereby increasing reading frequency. Furthermore, students generally appreciate the convenience of keyword searches of e-books, discovering new reading strategies involving integration and explanation. Students tend to read printed books for comprehension and to use keywords to directly search for solutions in e-books. It seems that an increasing number of students are engaging in digital reading for academic purposes.

CONCLUSION

The research results reveal students' high demands for reading e-books. The convenience of not being restricted to time and space is popular among students when considering the importance of e-books. The results show that students are not familiar with e-book resources and how to use them, and that digital reading can be limited by software and hardware issues. In addition, note-taking can be challenging because of the unfamiliar interface. Therefore, students should participate actively in the e-book use education courses offered by libraries to increase their understanding of e-books and to improve their ability to use e-book reading software to enhance their e-book information literacy. Students encounter many difficulties in the digital reading experience, including the limitations of software and hardware, the challenges involved in underlining and making notes, and the unfriendly user interface. Students expressed the view that unstable software or hardware might hinder their e-book reading. E-book firms could improve the stability of software and hardware, thereby enhancing students' use satisfaction. It is therefore suggested that e-book firms should

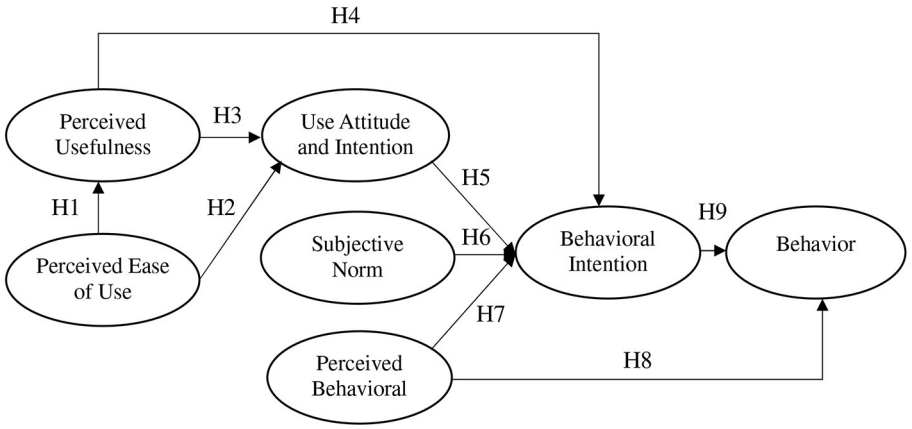

FIGURE 1 | Conceptual structure.

TABLE 1 | Structural equations model result.

Parameter/evaluation standard	Coefficient	*T*
Perceived ease of use→perceived usefulness	0.134	2.422**
Perceived ease of use→attitude	0.177	3.288**
Perceived usefulness→attitude	0.183	2.735**
Perceived usefulness→behavioral intention	0.196	3.626***
Attitude→behavioral intention	0.167	4.257***
Subjective norm→behavioral intention	0.171	4.962***
Perceived behavioral control→behavioral intention	0.206	5.583***
Perceived behavioral control→behavior	0.157	1.927**
Behavioral intention→behavior	0.214	3.641**
χ^2/degree of freedom ≦5	3.134	
Root mean square error of approximation (RMSEA) ≦0.08	0.034	
Goodness-of-fit index (GFI) ≧0.9	0.968	
Adjusted goodness-of-fit index (AGFI) ≧0.9	0.925	
Root mean square residual (RMR) ≦0.05	0.03	
Normed fit index (NFI) ≦0.9	0.942	

***, ***Stands for the significance under the significant standard of 5%.*

regularly survey readers' digital reading experiences and improve the e-book service to increase students' e-book use intention.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the Ethics Committee of the Guilin University of Technology, with written informed consent being obtained from all the participants. The research protocol was approved by the ethical committee of the Guilin University of Technology.

AUTHOR CONTRIBUTIONS

Y-ZL performed the initial analyses and wrote the manuscript. Y-MX was responsible for the methodology, software, and validation. Y-YM and CL assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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BRIEF RESEARCH REPORT
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Study of Influence of Different Models of E-Learning Content Product Design on Students' Learning Motivation and Effectiveness

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As teachers provide one-way teaching demonstration or reference materials in class, students lack of the opportunities for direct operation. The provision of interactive e-materials could reduce the need for instructors to prepare complicated teaching aids and could deal with issues of climate and location. Learners could learn any time, anywhere, and learning could be reinforced by repeating the instruction with no need to disrupt timetables. The participants in the experimental teaching study were 275 product design students who engaged in e-learning for 15 weeks (3 h per week for a total of 45 h). The research results are summarized as follows: (1) Interactive teaching materials can enhance students' active learning styles so that, in the product design area, this method could reduce learning differences in students. (2) E-materials deliver knowledge using simple and specific images, animation, audio, and video, making learning interesting and relaxed for the product design students. E-learning is easy and practical and reduces learners' cognitive load. (3) Students' cognitive development and prior knowledge should be considered in the development of e-materials. Simple images, animations, text, and language could improve the attention and learning motivation of product design students and allow students to learn based on prior knowledge. A suggestion, based on the findings, is the application of various communication teaching models using e-materials to course work for the product design students, enabling discussion, analysis, concept formation, and problem-solving.

Keywords: product design, e-learning material, motivational belief, learning gains, learning effectiveness

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INTRODUCTION

E-learning presents the functions of global communication, message switching, cooperative learning, and instant messaging. When applied properly, it deals with traditional media deficiencies and enhances the high application value of learning effectiveness. Furthermore, using the convenience of the Internet for "Internet-assisted teaching," and placing the e-learning content prepared by teachers on websites, teachers could organize the content and Internet resources for learning Internet learners and for teachers, classmates. Learning management platforms

and digital content are required for Internet-assisted teaching. The learning management platform is the online instruction tool for teacher–student interaction. Students can engage in discussion, observation, and cooperative group learning on the learning management platform. Teachers can provide teaching and guidance activities on the platform.

Digital content has various forms and characteristics. Simulation software can compress time, slow down the process, allow student participation, present safe experiments, and save money and other resources, making the impossible possible. E-learning material can be repeated in various forms and situations. Therefore, the form of digital content is a factor in online learning. Proper training is important to enable instructors to cope with different styles of learners. For maximum benefit, the content should match the learning styles, expectations, and approaches to instruction of the learners. Belonovskaya et al. (2020) mentioned that it is worth noting that continuing education concerns not only modern youth, but also older generations, who will also be affected by new technologies in the very near future. This study explores a new model of e-learning content aimed at product design students. Learning motivation and learning effectiveness are also investigated. Various communication teaching models for digital content are intended to help the students to deal with learning problems through discussion, analysis, and induction. The models could help students to establish correct concepts and to develop problem-solving abilities.

LITERATURE REVIEW AND HYPOTHESES

Teng (2019) mentioned that rich, lively, and changeable digital content was essential for making online learning attractive to learners. Online learning should be a combination of various forms of digital content. It should be adaptable to learners' characteristics and to the teaching goals. It was expected that learners could achieve the Internet-based teaching goals of activeness, interaction, simulation, and accumulation of learning. Demirkan (2019) pointed out the interaction between content and learners as a major characteristic of Internet courses, rather than the teaching content. Interaction with digital content on the Internet affects students' learning motivation. Scherer et al. (2019) found that interactive simulation content could strengthen learning motivation, reinforce the understanding of the learning process, and transfer to other similar situations, thereby avoiding classroom-based learning in challenging situations. In the simulation process, the delivery of content could be slowed down, and learners could construct personal learning concepts and develop validation and exploration mechanisms. The dynamic and interactive visual presentation allowed learners to correlate new material with previous experiences to develop an effective approach to improve conceptual learning. Therefore, the following hypothesis is proposed.

H1: The model of product design e-learning content would affect learning motivation.

Frolova et al. (2019) indicated that highly interactive computer-assisted instruction allowed computers to provide fast responses and gave users different degrees of learning control. The interactive learning control could be more efficient than computer-assisted instruction. Beatty et al. (2018) mentioned that teaching on the Internet could be preceded by a "classroom scene" and that there had to be "immediate spread" and "interactivity" to achieve effective teaching. Ugur (2019) studied constructive instructional design and considered that the learning system design had to match various instructional strategies. It had to consider the interaction between learners and learning content. For content design, multimedia, audio, and video could be utilized to induce students' curiosity and to achieve the objective of student–content interaction. Online learning could help students to learn using interactive digital content. Accordingly, the following hypothesis is proposed in this study.

H2: The model of product design e-learning content would affect learning effectiveness.

Yaman (2018) identified correlations between learning motivation and academic achievement. Learning motivation, as the motive force and guidance of learners' learning behavior and performance, could help learning behavior to advance continuously and to work toward specific directions or objectives. The apparent strength of learning motivation would directly affect individual learning and indirectly affect learning outcomes. Chartofili and Fokides (2019) found that students with high learning motivation presented definite goals and a strong desire to learn the content well. They had higher expectations of the outcome and better self-efficacy. It was also discovered that higher learning motivation would result in better effectiveness. Navarro-Pérez et al. (2019) found better performance in students with high learning motivation and better performance in students with intrinsic motivation than in those with extrinsic motivation. Consequently, the following hypotheses are proposed.

H3: Learning motivation presents significant and positive effects on learning effect in learning effectiveness.

H4: Learning motivation shows remarkable and positive effects on learning gains in learning effectiveness.

METHODOLOGY

Measurement of the Research Variables

Learning Motivation

Referring to Hwang et al. (2019), learning motivation is divided into (1) intrinsic orientation and (2) extrinsic orientation.

Learning Effectiveness

Referring to Chung et al. (2019), (1) learning effect and (2) learning gains are discussed.

Research Objective and Sampling Data

In the experimental research, 275 college students from the Department of Product Design in Taiwan participated in a 15-week (3 h per week for a total of 45 h) using experimental

teaching. On completion of the e-learning course, the students completed a questionnaire. The answers to this questionnaire were analyzed using SPSS, factor analysis, reliability analysis, regression analysis, and analysis of variance to test the various hypotheses.

Analysis Method

Analysis of variance was used to identify the difference made by the model of product design e-learning content on learning motivation and learning effectiveness. The relations between learning motivation and learning effectiveness were further identified using regression analysis.

RESULTS

Reliability and Validity Analysis

Learning motivation, with factor analysis, was extracted using the two factors of "intrinsic orientation" (eigenvalue = 2.164, α = 0.83) and "extrinsic orientation" (eigenvalue = 1.8626, α = 0.87). The cumulative covariance was 74.925%.

Learning effectiveness, with factor analysis, was extracted using the two factors of "learning effect" (eigenvalue = 3.673, α = 0.90) and "learning gains" (eigenvalue = 3.104, α = 0.93). The cumulative covariance was 84.066%.

Effects of the Model of Product Design E-Learning Content on Learning Motivation and Learning Effectiveness

Difference Analysis of the Model of Product Design E-Learning Content in Learning Motivation

Analysis of variance was applied to identify the difference made by the model of product design e-learning content in learning motivation. The results show a significant difference in the product design e-learning content in intrinsic orientation. Interactive simulation (4.17) shows higher intrinsic orientation than streaming (3.69). Different models of product design e-learning content reveal remarkable differences in extrinsic orientation. Interactive simulation (4.34) appears higher for extrinsic orientation than for streaming (3.42). Therefore, H1 is supported.

Analysis of the Model of Product Design E-Learning Content in Learning Effectiveness

Analysis of variance was applied to identify the difference made by the model of product design e-learning content on learning effectiveness. The result shows a noticeable difference made by the model of product design e-learning content on learning effectiveness. Interactive simulation (4.26) indicates a higher learning effect than streaming (3.75), and interactive simulation (4.51) appears to bring about higher learning gains than streaming (3.91). Therefore, H2 is supported.

Correlation Analysis of Learning Motivation and Learning Effectiveness

Correlation Analysis of Learning Motivation and Learning Effect

The analysis results in **Table 1**, testing H3, reveal the significant effects of intrinsic orientation (β = 2.362**) and extrinsic orientation (β = 2.147**) on learning effect. Therefore H3 is supported.

TABLE 1 | Analysis of learning motivation on learning effectiveness.

Dependent variable→	Learning effectiveness			
Independent variable↓	Learning effect		Learning gains	
Learning motivation	*β*	*P*	*β*	*p*
Intrinsic orientation	2.362**	0.000	2.219**	0.000
Extrinsic orientation	2.147**	0.000	2.527**	0.000
F	26.417	35.304		
significance	0.000***	0.000***		
R^2	0.247	0.315		
adjusted R^2	0.218	0.297		

***p < 0.01 and ***p < 0.001.*
Data source: self-organized in this study.

Correlation Analysis of Learning Motivation and Learning Gains

The analysis results in **Table 1**, testing H4, show the remarkable effects of intrinsic orientation (β = 2.219**) and extrinsic orientation (β = 2.527**) on learning gains. Therefore, H4 is supported.

DISCUSSION

Digital content delivers knowledge through images, animations, audio, and video and stresses simplicity and specificity. The aim is to make students feel that their learning is relaxed, interesting, and easy. Over-elaborate material could result in an excessive cognitive load. Effective learning should take the relationship among stimulus, response, and reinforcement into considerations. Under such an idea, learning content is divided into small units for learning in order and designed with the following principles. (1) Make definite learning goal and learner characteristics. (2) Use job analysis for dividing the teaching unit into several small units, and merely a small unit is preceded at a time. (3) Learning content is presented from simply to difficulty. (4) Feedback or reinforcement must be suitable for learners' cognition to give proper feedback or reinforcement. (5) Teaching materials should match learners' characteristics to offer massed practice or distributed practice. When approached correctly, interactive simulation content seems to have better learning effectiveness than teaching material involving complicated concepts and operations. When content design follows content concepts, and the level of difficulty in digital content takes the cognitive load into consideration, students' learning effectiveness is enhanced. Students' cognitive development and prior knowledge should be taken into account when digital content is being developed. When content is designed and using simple images, animations, text, and language to the greatest possible degree, based on their earlier experiences, students' attention and learning motivation will be enhanced.

CONCLUSION

The research findings show that interactive simulation content could enhance students' learning effectiveness. In the experiment, the experimental group and the control group show notable differences in teaching content. In other words, interactive simulation content could enhance the learning effectiveness of teaching content. This could be the reference for future content design. Interactive simulation content provides simulated situations, allowing students to operate computer software. The human–computer interaction allows students not only to accept the information delivery through the sounds and images in the content but also to operate freely, to explore, and to observe. Students can access individualized instruction and be taught in accordance with their aptitudes. In this case, digital content with interactive simulation could reduce differences in learning styles. Such a method could be considered in the content design to reduce the differences among students with different learning aptitudes. Instruction with interactive simulation-based digital teaching materials could provide large amount of information for learners in a unit of time but might result in leaders' cognitive overload. To reduce leaners' cognitive load, unloading technique, decomposition technique, drill technique, cleanup technique, tagging technique, adjustment technique, redundancy elimination technique, synchronous technology, and personalized design could be applied in the interactive simulation-based digital teaching material design.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the ethics committee of the National Cheng Kung University, Taiwan, with written informed consent being obtained from all the participants. All the participants were asked to read and approve the ethical consent form before participating in the present study. The participants were also asked to follow the guidelines in the form in the research. The research protocol was approved by the ethical committee of the National Cheng Kung University, Taiwan.

AUTHOR CONTRIBUTIONS

M-DS performed the initial analyses and wrote the manuscript. H-YH assisted in the data collection and data analysis. Both authors revised and approved the submitted version of the manuscript.

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MINI REVIEW
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Why Web-Conferencing Matters: Rescuing Education in the Time of COVID-19 Pandemic Crisis

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Physical interaction between humans has steadily decreased over the past year as a result of the COVID-19 pandemic. As a result, the adoption of e-conferencing has seen a huge increase in conducting business globally and technologically mediated interactions are now the order of the day—the new normal. The virtualization of meetings promotes collaboration among colleagues, target markets, associates, teachers, and students working towards the organization's objectives. Using web conferencing in learning meets the primary goal of both educators and students. It facilitates the creation of the best learning environment for students and aids in the realization of a balance between life and teaching duties for educators. Through web conferencing, higher learning institutions have the ability to capitalize on the available technologies to expand access to instructors online while also creating new experiences in the teaching and learning environment. The elimination of the need to travel for students' field trips has also been realized due to technological advances, and virtual tours have replaced these trips. A descriptive approach is adopted for the study, and it relies on information from peer-reviewed journals. Drawing from the literature review, the study first identifies web-conferencing in various facets of education. Secondly, it discusses web-conferencing adoption and its influence on teaching and learning. Third, a discussion on the importance and benefits as well as disadvantages of web-conferencing is outlined. Fourth, the study exemplifies two web-conferencing platforms: Zoom and Google Meet. The study further discusses the future of adopting web-conferencing in education.

Keywords: web-conferencing, education, COVID-19, pandemic, crisis

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INTRODUCTION

According to Loch and Reushle (2008), web conferencing is the process of carrying out live training, meetings, presentations, collaborations, or launching new products and services through the Internet. Web conferencing platforms are computer software that enables users to have a meeting virtually or communicate through the Internet. These software programs are divided into two main categories: those that only offer audio and video communication and those that offer audio, video and features like document sharing, access to the desktop, and editing during the virtual meeting. Web conferencing disseminates real-time video content across a wide group and is a collaboration tool used to attain a competitive advantage. It facilitates one-on-one or group virtual meetings with students, staff, and other stakeholders. Finally, web conferencing has eased the extension of activities to a wider global reach while eliminating travel costs.

In 2014, Thailand modernized procedural requirements for institutions when conducting day-to-day business. The government passed and announced the National Council for Peace and Order No. 74/2557 concerning teleconferencing using electronic devices (Pornavalai and Supakijjanusorn, 2017). Due to the Ministry of Information and Communication Technology's security standards on teleconferencing (B.E. 2557), corporations can securely hold online meetings through electronic means instead of meeting physically, which was previously the norm (Pornavalai and Supakijjanusorn, 2017).

In Thailand, learning institutions have embraced M-Learning, and most universities in the country have adopted larger budgets to accommodate online learning. Tutors should use instruction media, worksheets, and videos to embrace this online service. Web-based interactive learning environments, web-based instruction, and web-based multimedia presentations ensure smooth learning (Sastramiharja, 2019). Thailand is in its fifth wave of technology, where online learning has become a norm. The provision of education is personalized, facilitative, and responsive through technology. Learning institutions have changed their office design, lecture rooms, and support services to accommodate online learning.

Therefore, the adoption of informational and technological systems, such as web conferencing, are beneficial in the field of education. These technological changes change the flow of information, thus allowing access to data and eliminating decision-making delays. According to Loudon et al. (2012), new information technology alters how new information technologies reengineer working processes. Collaboration is an aspect of education that is significantly affected by the adoption of information technology. It is defined as the process of working with other team members to attain shared objectives (Bower, 2011).

Collaboration is mainly geared toward accomplishing organizational objectives and can have, either short or long-term effects. These effects are dependent on the nature of the task and the relationship between the involved parties. Collaboration can occur between two or more people and through informal teams. According to Loudon et al. (2012), the success of an organization is directly influenced by its ability to collaborate internally and externally. As a result, investment in collaboration technology is necessary to make the collaborative learning process a reality. Supportive culture is essential for the realization of meaningful collaboration (Islam, 2019). Further, any organization that aims to attain collaboration needs to build its collaborative capabilities through open culture and decentralized structure. Bower (2011) states that there are several collaborative tools that aid in the conduction of learning processes. These tools include e-mail, audio, video conferencing, and web conferencing.

THE MULTIMEDIA WEB CONFERENCING EXPLORATION AND ITS RELATION TO EDUCATION

Web conferencing's combination of audio and visual communication has enhanced learning institutions' productivity through its capacity for information sharing. There has been a growth in teaching and English language learning via this model as school departments, and teachers exploit this technology to expand the delivery of content. Web conferencing has seen communication improvements between teachers and students as they can continue teaching and learning outside the classroom setting. Further, web conferencing has proved necessary in remote education, melded education, and disciplines where shared nonverbal and verbal communication offer an improved educational experience. The culmination of bandwidth enhancements, progress in video compression procedures, and hardware scale frugality have eased web conferencing tools' access through personal computers, which is required in education. One of the oldest web conferencing softwares used in education is Elluminate Live, which was later merged with Blackboard collaborate.

For information to have a lasting effect between involved parties, the medium and manner in which the information is relayed are important. First, according to Bonk et al. (2016), web conferencing improves the level of understanding between those involved in the communication process, similar to a one-on-one scenario. Humans have a low auditory recognition memory performance; however, they possess high visual recognition memory (Bonk et al., 2016). Therefore, web conferencing taps into both the weakness of auditory and the strength of visual memory to ensure effective and efficient communication outcomes are attained.

Web conferencing communication provides facial expressions, gestures, and other visual cues integral in the communication process. Having proper communication skills and ethics enhances understanding, which in turn helps foster relationships. Proper communication is a process, and for it to be complete and successful, it must undergo the full cycle (Bonk et al., 2016). Due to the urgency of communication, especially during a group project and over a widely dispersed group, web conferencing bridges a geographical gap. It is critical to have an instant communication avenue for all of those involved. Web conferencing is a tool for communication that is essential for eliminating the overflow of messages via emails since communication can take place in real time.

In the quest to construct an informed community, it is expected that the learning process should be geared toward meeting the technological demands of new markets. This mission can only be realized if these new technological advancements are incorporated into teaching and learning processes. According to Morgan (2001), there are three stages involved in the adoption of web conferencing as a learning tool. The first stage involves the use of technology as a delivery tool for scholastic content. The second stage involves considering the learning needs of the students to aid in designing the learning environment. Lastly, the third stage involves adapting to the students' needs, but now with increased bandwidth.

By using web conferencing as a learning tool, learning and teaching function in a synchronous manner. Students and teachers interact in realtime, thus, eliminating frustration and adopting a more social approach. To effectively use web conferencing as an educational tool, teachers must carefully plan for these sessions. First, they are required to set goals and expectations for the learning session as well as examine all web conferencing tools that will be used. Second, it is important to consider the size of the class when using web conferencing for teaching. The control of audio and visual content sharing tools

during learning sessions, especially when there is a large number of participants, requires a much more guided approach than when few people participate. Therefore, teachers must carefully consider their class size before embarking on web conferencing for teaching.

Likewise, the web conferencing framework manages a few costs, including the number of students to apparatuses. It allows the capacity to flip between pre-characterized formats during learning scenes and to make new designs by hauling and resizing the apparatuses they wish to utilize while the learning action is attempted. Designs are updated to meet the synergistic prerequisites of learning activities, either ahead of time or powerfully during a learning scene. For coordinated effort, diverse web conferencing permits students to chip away at equivalent reports, programs, or thoughts simultaneously.

During a web-based learning session, students can share displays and provide control access to one another. Queries tend to increase progressively. On the off chance that a one-on-one meeting takes place, web gathering permits synchronous input. However, allowing students access the virtual space concurrently can be problematic, so web conferencing requires organized access. Learning institutions adopt web conferencing as a collaboration tool to attain competitiveness.

Several features of web conferencing enable users to work on the same task simultaneously. Features such as screen sharing allow collaboration and reading from the same book and so organizations must establish an effective knowledge management system. Knowledge is carried by people, skills, and other experts and organizations need to maximize knowledge inflow while minimizing outflow.

One strategy to attain this is to share knowledge organizationally and web conferencing is a major player in doing so. It creates an environment where people interact and share knowledge effectively (Chong et al., 2009). However, knowledge management entails much more than mere collaboration or knowledge sharing. It requires bridging the global gap experienced by many organizations. Thus, without web conferencing global companies would suffer greatly.

Additionally, web conferenced schooling requires quality sound recording devices and a reliable internet connection. A proper microphone is essential for reducing audio feedback and eliminating background noise during class sessions. Finally, to obtain the maximum result from a web conferenced learning and teaching session, it is important for teachers to establish ground rules. Informing participants on how to communicate and engaging students' attention is essential.

In developing and implementing this technology, a smooth transition to the virtual environment is essential for students. Therefore, it is essential to analyze the determinants of web conferencing in the learning environment.

FAVORABLE AND UNFAVORABLE FACTORS AFFECTING THE USE OF WEB CONFERENCING IN EDUCATION

Understanding the reasons for the adoption of web conferencing as an educational tool is useful to ensure user satisfaction and in proving its worth for learning institutions. The first factor is the user's ability to operate web conferencing as an educational tool. Secondly, are students and teachers motivated to use the technology? Finally, what are the anxieties surrounding the technology and why might its use be avoided?

Using new technologies, among students and teachers, can be determined by examining self-efficacy. Self-efficacy, an integral construct of social psychology, is the belief in one's ability to carry out an activity. It is largely informed by the cognitive theory that humans learn by observing and imitating others (Bandura, 1986). Compeau and Higgins (1995) first coined the concept of self-efficacy regarding the use of computers and their software in 1999. It focuses on the perceived ability of an individual to operate a computer. Measuring self-efficacy entails component expertise, such as the use of the Internet or special computer skills, and determines students' judgment ability to utilize their digital literacy skills to perform overall educational tasks.

The adoption of web conferencing for learning has been associated with immense benefits for both students and teachers. According to Hurst (2020), web conferencing programs in schools increases collaboration between learning institutions. Second, it provides students with a medium for improving language learning. Third, it increases the accessibility to learning materials for both teachers and students. Web conferencing further provides mechanisms for the inclusion of subject knowledge and subject specialism into the learning curriculum. It does so by bringing experts from the same fields together and placing them into a single setup to provide learning content. Additionally, it connects schools, companies, and society widening teachers' and students' access to professional development opportunities (Mavridis et al., 2011).

According to Duckett (2020), web conferencing systems allow for a collaborative approach to learning through interaction facilitation and team construction of knowledge. This means, increased interaction between students in online classes has had positive effects on learning outcomes and student achievement. Thus, the adoption of web conferencing tools for learning offers a student-centered collaborative online learning environment that fosters independence and creative thinking while simultaneously building collaborative skills among students.

Despite all this, Hills (2003) and Sintema (2020) claim that web-based learning is not entirely beneficial to all students. While some students find virtual interaction more appealing, others view it as repulsive (Hills, 2003). In line with Hill's conclusion, a study by Wei and Johnes (2005) established that online learning reduced contact and was less instant than the physical learning environment. This created a sense of seclusion, and as a result, Wei and Johnes (2005) concluded that web-based learning tools should complement traditional schooling and not replace it. Face-to-face meetings are still preferred for effective communication and successful mastery of knowledge and skills (Larsen, 2015).

According to Mheidly et al. (2020), facial expressions are essential in ensuring effective communication; therefore, online platforms may create room for misunderstanding between teachers and students as it can be difficult to discern body language and expressions over a screen. Besides, most teachers value personal contact with their students, and the

lack thereof limits their ability to assess the concentration and participation of their students (Pokhrel and Chhetri, 2021). By reducing human contact, online meetings may also undermine social relationships, hence, they are not suitable for activities that require social relationships. An online meeting also lessons the opportunity for after-class talks to canvass what was discussed.

Further, students have also expressed mixed reactions to the implementation and adoption of web-based teaching and learning approaches. These reactions are attributed to students' levels of anxiety and motivation. According to Gegenfurtner et al. (2020), students' ability to use new software plays a role in limiting their preference in adopting new technologies. It is undeniable that some teachers and students struggle with and resist technology due to its complexities (Collis and Moonen, 2008). For this reason, web conferencing can discriminate against students who are not familiar with the technology. That being said, in some cases, technological limitations are the reason for low performance. However, it is up to teachers and learning institutions to overcome these students' barriers and improve the rate of adoption. They can tackle this issue by understanding the factors that limit students' willingness to adopt the new technologies.

Additionally, Internet connections can be interrupted, which causes disruptions in online classes, thus, reducing effectiveness and damaging the flow of useful information. Disruptions are exacerbated by low-quality equipment, so this could be corrected by installing high-quality equipment. However, it is important to note that institutions may be able to afford higher-quality equipment but not all students have access to high functioning technology.

Finally, learning may be vulnerable to becoming lax because face-to-face classes are characterized by adequate planning more than online classes. Nevertheless, online classes have more advantages than disadvantages and are game changers in learning in the 21st century.

EXAMPLES OF WEB-CONFERENCING PLATFORMS UTILIZED IN EDUCATION

In the researcher's perspective, Zoom and Google Meet are two of the useful web-conferencing platforms in the field of education. First, Zoom is a cloud-based online platform used for web conferencing audio, meetings, live chats, and meeting recordings. Zoom has grown in popularity as a web conferencing solution (Bernazzani, 2020). Zoom meetings are video conferencing meetings that use online platforms that allow co-located and remote meeting participants to communicate frictionlessly. In this case, a participant does not need to own a zoom account to participate in a zoom meeting. Zoom meetings enable individuals to attend to customers and engage in virtual interviews. Participants can join such meetings using cameras, phones, or webcams (Bernazzani, 2020). Teachers should identify the right plan for students, which the learning institution typically facilitates. The free pricing tier is a good option for people testing the platform. Using Zoom's free version, participants can hold meetings and conferences with up to 100 participants for up to 40 min, but no time limit for one-on-one meetings (Bernazzani, 2020).

Google meet (Google Hangouts Meet) is designed for users to join a virtual meeting and share videos or speak to each other from different locations via the Internet. Google Meet has features that make it optimal for learning institutions. These features include recording, scheduling meetings, and screen sharing. Livestreams can accommodate approximately 100,000 students (Fedena, 2020). Paid-for accounts include G Suite basic, G Suite Business, G Suite Enterprise, that enables a user to host more participants in a single meeting. To join a Google Meet class, students need the code created after the meeting was scheduled. Click on the link, sent by the teacher, and "Enter a Meeting Code" (John, 2019). The session commences once the code has been input and accepted. Students must allow Google Meet to access their devices when setting up for the program for it to function correctly. It can be accessed by the website or the application. However, Google Meet does not provide annotation, remote control, and breakout room as Zoom does.

FUTURE OF WEB-CONFERENCING IN EDUCATION

It is debatable whether web conferencing has changed how learning is conducted. With the emergence of the COVID-19 pandemic that started in late 2019, learning institutions struggle to sustain their level of learning facilitation as people find it challenging to travel from one region to another (Nalakath, 2020). Companies such as Zoom have become extremely profitable as most companies and learning institutions are buying online conferencing services to continue functioning.

Previously, web conferencing received little attention, as most learning institutions utilized physical classes and lectures. However, web conferencing has physical ways of facilitating education and virtual classes have improved by advancing technology. This benefits a growing number of students seeking education from all over the world (Chazen, 2021). Teleconferences have empowered lecturers, students, motivational speakers, and others to work and communicate with colleagues and students from virtually anywhere.

Still, some scholars believe that physical classes are more efficient for learning. From the above findings, it is evident that technology has disrupted classical learning and educational approaches. Learning, especially in higher institutions, has evolved tremendously, and more technological tools are becoming available for student engagement (Chazen, 2021; Ma and Li, 2021). The emergence of digital media and the implementation of online tools have modernized education while driving student-teacher engagement (Vlachopoulos, 2021).

CONCLUSION

Web conferencing systems allow for a collaborative approach to learning through interaction facilitation and team

construction of knowledge. Increased interaction between students positively affects students' learning outcomes and achievements. As a result, the adoption of web conferencing tools for learning is the greatest form of offering a student-centered collaborative online learning environment that fosters independence and creative thinking while simultaneously building collaborative skills among students. The web conferencing framework, likewise, managed the cost of a few adaptabilities, including the capacity to change the entrance control of members to apparatuses, the capacity to flip between pre-characterized formats during learning scenes, and the ability to make new designs by hauling, dropping, and resizing the apparatuses they wish to utilize while the learning activity is being attempted. This permits designs to be updated to meet the synergistic prerequisites of learning activities, either ahead of time or, powerfully, during a learning scene. For coordinated effort, diverse web conferencing permits students to chip away at equivalent reports, programs, or thoughts simultaneously. Students can share their insights on the subject with ease. For instance, when a group deals with new prerequisites for commercial development, automated conceptualization could be valuable. A class conducted through web conferencing allows for the sharing of displays and provides controlled access to one another. Queries can be tended to in single one-on-one meetings; therefore, web gatherings permit synchronous input. While useful for conceptualizing, concurrent entrancing can be problematic, so web conferencing requires organized access.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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BRIEF RESEARCH REPORT
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A Study on Flipped Learning Concerning Learning Motivation and Learning Attitude in Language Learning

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From the popularity of flipped teaching in United States primary and high schools, it is thought that students have more learning control to adjust to the learning progress and are assisted in problem solving and learning guidance during class period. It is believed that flipped teaching could prompt underachieving learners' active learning and thereby enhance learning effectiveness. A total of 386 high school students in Chungli, Taiwan, were part of an experimental study and the research results are summarized below: (1) Students who participated in the flipped teaching models demonstrated better comprehension levels with the teaching content due to this change in learning style and attitude, which in turn, enhanced learning effectiveness. (2) To eliminate poor language performance of underachieving students, it is necessary to lay solid foundations to gradually enhance language learning effectiveness regarding this particular group of students. Films suitable for students' individual ability could be combined with new language learned in the unit to genuinely assist underachieving learners' language learning effectiveness. (3) For students who care about their performance, a "system of play" style grouping should be determined in order to enable the tracking of group performance and term performance. According to the results, further developments regarding active learning ability, boosts in learning interests, enhanced learning effectiveness, and the prompting of creativity resulting in a shift from passive learner to active learner have been proposed.

Keywords: flipped learning, language learning, learning motivation, learning attitude, cognition component, affection component, behavioral tendency

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INTRODUCTION

Due to serious global competition, countries throughout the world are positively changing their domestic education models to enhance national competitiveness. In education reform policies, the use of technology or e-learning has become prevalent. In this way, domestic educational initiatives are provided equally regardless of socioeconomic status and region; the principle of teaching

students in accordance with aptitude expects to provide learning styles suitable for students with distinct intelligence. Traditional teaching sites are limited to instructors and teaching hours which can make it difficult to achieve the goals of teaching without partiality and teaching students in accordance with aptitude. E-learning is not restricted to time and space and could precede individualized instruction. In addition to thinking of teachers' techniques, different levels of ability to teach students are also considered in various countries. According to current education goals in the world, it is of primary importance to cultivate students' reading ability, mathematical ability, and scientific literacy, encourage cooperation with others, and develop problem-solving abilities.

In order to help slow learners or students not able to keep up due to missing classes, teachers introduced a new teaching approach in their lessons, aiming to have more adaptive classes; students could adjust to the learning progress according to their personal learning pace. Teachers first record the full lessons for students learning at home; the major course content is covered in the teaching films. Task-based learning activity or learning content questioning and discussion are preceded in the classroom. Teachers do not lecture like in formally structured lessons of the past but instead focus mainly on teacher–student interaction. In this manner of teaching, lots of time is allocated for group discussion, homework guidance, and critical thinking in class; besides adaptive instruction could be preceded for guiding slow learners. Such a teaching method is known as flipped teaching.

Chukwuemeka et al. (2021) stated that while suffering from COVID-19, many countries decided to give distance learning a try. Ways of getting an education have had to modify due to the epidemic crisis, but it also sheds some new light on education. It helps teachers to think out of the box and provide a more diversified way of teaching. The range of e-learning has crept up and shown its advantage during COVID-19. The pandemic has brought not only crisis to humans, but also chances (Nerantzi, 2020). We live in a modern society with computers, the internet, and artificial intelligence constantly developing. In the process of producing e-learning teaching materials, flipped learning shows a different technical mean and education method from the traditional ones. It can be seen that students sing the praises of the contents of e-learning and the teachers' wisdom and responsibilities (Drozdikova-Zaripova and Sabirova, 2020). The concerned departments of education gather teachers with e-learning experience to record video courses of online teaching introduction and online flipped teaching implementation guidelines for students that are in home quarantine during the epidemic prevention period. They also collect e-learning resources, platforms, and tools for teachers and students, so that they can arrange the course or self-study (Umutlu and Akpinar, 2020).

Flipped learning in language learning induces the learning interests and more effectively enhances the learning effectiveness and inspires creativity in changing passive learners into active learners.

LITERATURE REVIEW AND HYPOTHESES

Chang and Hwang (2018) regarded the main value of flipped classroom as changing class hours into the form of a workshop and having students test their application knowledge through inquiry and mutual discussion. Hence, teachers become coaches or consultants encouraging students to participate in group discussion or individual inquiry. Therefore, flipped learning could better enhance students' learning motivation and attitude than traditional teaching. Bakla (2018) explained it as promoting students' active learning, including textbook text reading, taking preview notes, establishing Google teacher–student collaboration platforms, asking students to view teaching films in advance, establishing Facebook communities or groups for teacher–student discussion, and establishing an online evaluation system for students' answering or filling in self-learning checklists. The results revealed the promotion of students' learning effectiveness and learning motivation. Lin et al. (2018) combined a flipped classroom with mobile learning for mathematics teaching in elementary schools. The results showed that flipped learning, in comparison with traditional teaching, enhanced students' learning interests and motivation as well as promoted students' learning effectiveness; meanwhile, teachers and students presented a positive evaluation concerning the advantages of flipped learning. The following hypothesis is therefore proposed in this study.

H1: Flipped learning would affect learning motivation.

Zhang (2019) proposed a flipped classroom and requested that students read textbooks, handouts, or PPT before the class to preview relevant data in the lesson; a lot of class time was then saved for students asking questions and analyzing cases. Such a learning style received students' positive support to prove that students preferred the learning style of the flipped classroom, compared to traditional learning styles. Aiming at teachers with the practice of flipped learning, Alexander (2018) considered that flipping enhanced job satisfaction and students made progress in learning performance. Moreover, teachers noted the obvious improvement of students' learning attitude; some pleased teachers revealed that they would continuously apply the flipped learning model. Karabulut et al. (2018) indicated that the effectiveness of flipped learning was not simply on academic performance but could also enhance cooperation and thinking among students; meanwhile, it could change students' attitude toward learning and teacher–student interaction. Many teachers therefore would like to apply these new teaching methods. In this case, the following hypothesis is proposed and testified in view of the present study.

H2: Flipped learning would affect learning attitude.

Chen et al. (2019) proposed the positive correlation between learning motivation and learning attitude; when learning motivation was not satisfied, good learning attitude would not

be forthcoming. Awidi and Paynter (2019) regarded positive correlations between learners' learning motivation and learning attitude, i.e., the stronger the learning motivation, the higher the learning attitude of learners. Green (2019) found that the higher the learning motivation, the higher the learning attitude; learning motivation presented predictability on learning attitude, which was not only the indicator of learning attitude and learning outcome, but also the main indicator to induce learning motivation and curriculum development. Accordingly, the following hypotheses are proposed and testified in view of the present study.

H3: Learning motivation presents significant and positive effects on the cognition component of learning attitude.

H4: Learning motivation presents significant and positive effects on the affection component of learning attitude.

H5: Learning motivation presents significant and positive effects on behavioral tendency in learning attitude.

RESEARCH METHOD

Measurement of Research Variables

Learning Motivation

Referring to Chang et al. (2019), learning motivation is divided into intrinsic motivation and extrinsic motivation in this study. In the Likert 7-point scale, 1 refers to extremely disagree and 7 refers to extremely agree. The overall reliability coefficients of intrinsic motivation and extrinsic motivation appear to be 0.86 and 0.85, respectively.

Learning Attitude

Referring to Cheng and Tsai (2019), learning attitude contains a cognition component, affection component, and behavioral tendency with a Likert 7-points scale, 1 refers to the response of extremely disagree and 7 refers to the response of extremely agree. The overall reliability coefficients of learning attitude show 0.82 for the cognition component, 0.81 for the affection component, and 0.89 for behavioral tendency.

Research Object and Sampling Data

With experimental research, 386 high school students in Taiwan completed the 16-week (3 h per week for a total of 48 h) flipped learning. The data collected through questionnaires were analyzed with SPSS and further analysis of variance and regression analysis were utilized for testing the formulated hypotheses.

Statistical Tools Used

In this study, analysis of variance was applied to discuss the difference of flipped learning in learning motivation and learning attitude, and regression analysis was used for understanding the relationship between learning motivation and learning attitude of high school students.

ANALYSIS OF DATA AND TESTIFICATION OF HYPOTHESES

Effects of Flipped Learning on Learning Motivation and Learning Attitude

Differential Analysis of Flipped Learning in Learning Motivation

We can see from **Table 1** that the difference of flipped learning in learning motivation reveals a significant difference of flipped learning in intrinsic orientation, where flipped learning (4.33) shows a higher level of intrinsic orientation than traditional teaching (3.64) and similarly, flipped learning (4.18) shows a higher level of extrinsic orientation than traditional teaching (3.77). Hence, H1 is supported.

Difference Analysis of Flipped Learning in Learning Attitude

It is inferred from **Table 2** that the difference of flipped learning in learning attitude reveals a remarkable difference of flipped learning in the cognition component, where flipped learning (4.24) shows a higher level of the cognition component than traditional teaching (3.58), likewise flipped learning (4.05) shows a higher level of the affection component than traditional teaching (3.35), and similarly, flipped learning (4.46) shows a higher level of behavioral tendency than traditional teaching (3.98). Hence, H2 is supported.

Relationship Between Learning Motivation and Learning Attitude

Relationship Between Learning Motivation and Cognition Component

It is learnt from **Table 3** that the results of regression analysis reveal a notable effect of intrinsic orientation ($\beta = 2.287^{**}$) and extrinsic orientation ($\beta = 2.436^{**}$) on the cognition component of learning attitude. Hence, H3 is supported.

Relationship Between Learning Motivation and Affection Component

It is understood from **Table 3** that the results of regression analysis reveal significant effects of intrinsic orientation ($\beta = 2.155^{**}$) and extrinsic orientation ($\beta = 2.217^{**}$) on the affection component of learning attitude. Hence, H4 is supported.

Relationship Between Learning Motivation and Behavioral Tendency

It is inferred from **Table 3** that the results of regression analysis reveal remarkable effects of intrinsic orientation ($\beta = 2.382^{**}$) and extrinsic orientation ($\beta = 2.537^{**}$) on behavioral tendency of learning attitude. Hence H5 is supported.

RESULTS OF THE STUDY

The results of the study reveal that the students who were taught using "flipped teaching models" demonstrate better levels of comprehension due to changes in learning style and attitude

TABLE 1 | Differential analysis of flipped learning in learning motivation.

Variable		*F*	*p*	Scheffe *post hoc*
Flipped learning	Intrinsic orientation	18.627	0.000*	Flipped learning (4.33) > traditional teaching (3.64)
	Extrinsic orientation	25.439	0.000*	Flipped learning (4.18) > traditional teaching (3.77)

*The symbol * stands for $p < 0.05$.*

TABLE 2 | Differential analysis of flipped learning in learning attitude.

Variable		*F*	*p*	Scheffe *post hoc*
Flipped learning	Cognition component	21.577	0.000*	Flipped learning (4.24) > traditional teaching (3.58)
	Affection component	27.962	0.000*	Flipped learning (4.05) > traditional teaching (3.35)
	Behavioral tendency	33.125	0.000*	Flipped learning (4.46) > traditional teaching (3.98)

*The symbol * stands for $p < 0.05$.*

TABLE 3 | Relationship between learning motivation and learning attitude.

Learning motivation (independent variable)	Learning attitude (dependent variable)					
	Cognition component		Affection component		Behavioral tendency	
	β	*p*	β	*p*	β	*p*
Intrinsic orientation	2.287**	0.000	2.155**	0.000	2.382**	0.000
Extrinsic orientation	2.436**	0.000	2.217**	0.000	2.537**	0.000
F	27.162		34.859		37.281	
Significance	0.000***		0.000***		0.000***	
R^2	0.263		0.335		0.361	
Adjusted R^2	0.248		0.314		0.342	

*The symbols ** stands for $p < 0.01$ and *** stands for $p < 0.001$. Self-organized for this study.*

in the flipped classroom, which enhances their effectiveness in learning language than their counter arts who received traditional teaching.

The results of the differential analyses with regard to the dimensions of "learning motivation" reveal that there is a remarkable difference indicating that the flipped learning group possessed higher levels of intrinsic orientation (4.33) and extrinsic orientation (4.18) than the traditional learning group (3.64 and 3.77), respectively, in their "learning motivation."

The results of the differential analyses with regard to the dimensions of "learning attitude" reveal that there is a remarkable difference indicating that the flipped learning group possessed higher levels of the cognition component (4.24), affection component (4.05), and behavior tendency (4.46) than the traditional learning group (3.58, 3.35, and 3.98), respectively, in their "learning attitude".

The results of the regression analyses with regard to the effects of "learning motivation" on "learning attitude" are that (i) there are remarkable positive effects of intrinsic orientation (β = 2.287) and extrinsic orientation (β = 2.436) on the cognition component of learning attitude, (ii) there are remarkable positive effects of intrinsic orientation (β = 2.155) and extrinsic orientation (β = 2.217) on the affection component of learning attitude, and (iii) there are remarkable positive effects of intrinsic orientation (β = 2.382) and extrinsic orientation (β = 2.537) on behavioral tendency of learning attitude. While comparing the "adjusted R^2 values," it is found that the effects of intrinsic orientation and extrinsic orientation of learning motivation on behavioral tendency (0.342) are greater than that of the cognitive component (0.248) and affection component (0.314) of "learning attitude".

DISCUSSION

Students' low performance on language occurs slowly over time. In this case, a series of basic teaching initiatives are required to enhance low-performance students' language learning effectiveness step by step. Instructors could allocate suitable films with new language learned in the unit according to students' individual ability to help low-performance learners' language learning effectiveness. Students from different levels generating discussions in the same group could easily result in "hitchhike." In this case, group competition could be used in real teaching for students who care about their performance to be able to balance the group performance. In this case, students with better performance are willing to help low-performance students attain better learning motivation and learning attitude.

CONCLUSION

The research results show notable differences in language learning between the experimental group and the control group after the experimental teaching. Students in the experimental group present significantly higher language learning motivation and attitude than those in the control group. It reveals that flipped learning could help low-performance students enhance language learning effectiveness. In other words, flipped learning, compared to traditional teaching, could enhance students' learning motivation and learning attitude and because of these reasons flipped learning is certainly worth attempting. However, traditional teaching also maintains some advantages for it to remain and be alternatively used with flipped learning. With flipped learning, students feel that the teaching content is easier to learn and internalize. Furthermore, flipped learning allows students to discuss topics with each other and teachers to guide their learning.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the Ethics Committee of Chung Yuan Christian University, with written informed consent being obtained from all the participants. All the participants were asked to read and approved the ethical consent form before participating in the present study. The participants were also asked to follow the guidelines in the form in the research. The research protocol was approved by the Ethical Committee of Chung Yuan Christian University.

AUTHOR CONTRIBUTIONS

C-PC performed the initial analyses and wrote the manuscript. K-WC and C-JH assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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BRIEF RESEARCH REPORT
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Learning Through Digital Stories for Safe School Environment

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This study aimed to evaluate the impact of digital stories in the learning-based themes of safe schools and to examine the perceptions of special educational needs in safe school environments. Training were carried out with informative videos created through the Distance Education and Information Technology Center (UZEBIM) for principals and teachers-in-charge, and the effectiveness of this process was evaluated through reflective opinion forms. In addition to this, an evaluation form was presented to the prospective special education teachers to obtain their opinions and evaluate the effectiveness of digital stories at safe schools. A total of 100 prospective teachers participated in the evaluation of the impact of digital stories on their learning about safe school environments. Digital stories regarding safe schools become an important source of information in creating a safe school environment more rapidly and efficiently. In line with the interviews, it was observed that the awareness of safe school environments was increased and the digital dimensions of safe school environments were internalized through digital stories. Due to the raising awareness in the COVID-19 process, it was revealed that the schools did not have sufficient safe school characteristics and all stakeholders should take preventive measures in coordination to establish a safe school environment.

Keywords: special education, animation, COVID−19, digital story, safe school environment

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INTRODUCTION

The concept of a safe school environment has become important in education after the COVID-19. During the pandemic, the education systems have been affected due to health issues, and having a safe school environment has turned to be an essential issue in schools. On the other hand, the integration of technology into learning activities plays a great role to increase the awareness of the concept of safety in the practice (McBrayer et al., 2020; Packy-Green et al., 2020). Huang et al. give insights on open educational resources during school closures (Huang et al., 2020). This is an example of how the integration of technology can support the school systems. The quality of education relies on safe schools to foster learning activities (Guillemard, 2020).

A safe school environment is not limited to stakeholders who know how to protect their rights on various issues. It also includes the process of developing the school positively to create a strong commitment to the school with students, teachers, staff, families, and the school environment. No matter how complicated or multidimensional the concept of safe school is, it can be argued that if schools are aimed to be environments where students can meet their personal, social, and academic needs, the issue of safe school requires more attention due to various reasons emerging expectedly or unexpectedly from time to time.

The Safe Schools Declaration was issued in 2015 to reduce various issues causing conflict in education. Building capacity for teachers and improving school environments through subject-based training in safe schools turned to be essential. In addition, UNESCO emphasizes the measuring of the progress of Sustainable Development Goal 4 on Education. This goal relies on safe and non-violent learning environments for all children and adolescents. In this respect, achieving this target requires researchers to consider the theme of "provide safe, non-violent, inclusive, and effective learning environments for all" for the quality of education and sustainability through social justice. As UNESCO underlines the intensified need for safe, non-violent, inclusive, and effective learning environments, having a comprehensive look at safe school frameworks and the integration of digital technologies on learning play an important role in the establishment of safe school environments.

Schools become social agents to integrate digital transformation to enhance learning and teaching. In this respect, special education schools require the integration of principles of inclusive education. Therefore, in line with the principle of sustainable growth, the safe school policy within the aspect of inclusive education is essential. The study of Terrell et al. points out the importance of a comprehensive framework of safe and supportive schools (Terrell et al., 2020). In this respect, some essential issues such as physical safety and security and also emotional safety, physical environment, engagement, and norms and policies to be applied are to be considered.

Some individuals may differ significantly from their peers in terms of both their characteristics and their educational competence due to their different conditions. Depending on their age, gender, and social and cultural differences, individuals may also have some obstacles in terms of inability preventing to fulfill their roles adequately. As a result, some individuals may need to be engaged in special education. Special education can be defined as all of the educational services that are provided to students, which differ greatly from the average characteristics of students and are aimed to maximize the probability of individuals living without being dependent on anyone (Sari, 2012). Special education is a kind of education provided to individuals who are different from the majority and necessitate the application of special education programs, (i) ensuring that gifted individuals receive an education convenient for their gifts and that they make maximum use of these gifts, (ii) preventing the inadequacies of individuals from turning into disabilities, and (iii) supporting people with disabilities so that they can become self-sufficient, can integrate with the society, can behave independently, and can become productive individuals (Çankaya et al., 2014).

Stephens listed the factors affecting school security as follows: the personal behavior of all students and employees, the social and physical environment of the school, the behavior of school employees and students, and the economic state of the society that maintains its life around the school (Dönmez and Özer, 2010). The development of technology and its use in social institutions has caused a positive change in daily life. The use and dissemination of information and technology in special educational institutions along with individual differences is of great importance in terms of creating an effective learning environment. The use of computer software and technology that will facilitate the learning of individuals with special education will be a major factor both in responding to the needs of the individuals and in solving the problems they face in their daily lives. Again, using the technologies related to safety in schools can provide benefits in terms of reducing, monitoring, and intervening in a very short time to the safety problems that may occur in schools (Dönmez, 2001).

It is even more important that institutions with individuals requiring special educational needs have been turned into safe schools. Undoubtedly, in terms of school safety, students are primarily in need of protection in every aspect. On the other hand, the events show that administrators, teachers, and other employees are not safe enough (Hughes-Roberts et al., 2020). In this context, different theoretical perspectives on a safe school environment and dimensions of a safe school environment should be comprehensively addressed.

As described in detail in the above statements, the concept of a safe school environment is complex, and when it is handled with traditional education methods, it may not reflect the efficient processes in terms of time and economy. Therefore, the digital story method is used in this study to analyze and internalize these important concepts.

Digital games, which can be regarded as forms of digital stories in the current status, have also become important in education. They are now regarded as part of the tools for education activities in facilitating learning. Giving a chance for engaging learning and participation also makes an improvement in teaching capacity (Zhonggen, 2019). Games are beneficial for learners, especially for adults on their well-being (Chang et al., 2008) in terms of their emotional moods. The studies show that there are benefits and positive effects of training through video games on developing cognitive and emotional skills. The study of Zhonggen gives insight on trends in games and learning that games play an important role in improving learning effectiveness and in enhancing the learning experience (Zhonggen, 2019). In this respect, educational technologies, such as games and mobile applications, facilitate improvement in academic achievements and give a change to individuals to participate in learning activities. Thus, most games have turned into an effective tool in improving teaching-learning facilities. Games make learners have higher motivation in learning and improve willingness in learning actively (Chang et al., 2008).

With the emergence of the digital game approach, the physical-based traditional game approach is replaced by digitally produced game environments. The digital game is the new communication environment standing out as an individual communication environment that includes digitality, interactivity, virtuality, variability, and modularity and adds these features to the act of playing games (Hughes-Roberts et al., 2020).

When compared to traditional games, the phenomenon of digital games indicates a structure that develops outside of certain standards and is systematic within itself but generally quite dynamic. What makes the phenomenon most prominent in form and content is that it allows player-oriented communication. In digital games, the result is determined by the actions of

the player. In the sense that the actor, other players, and events affect each other, interactivity is the primary concept that determines the game phenomenon in digital form (Flynn et al., 2019).

The interactive communication opportunities offered by digital games to individuals create a brand-new socialization area for them. Personal profiles defined through the game characters or avatars make the player the leading character of the story with a very realistic story that immerses the individual and increases the permanence (Lee, 2019).

In this regard, digital stories in games are an effective learning and teaching instrument for students and teachers. For students, the digital story process is open to learning different skills. A digital story that personalizes the learning process contributes to the development of the skills of students such as research, writing, organization, technology, presentation, interview, problem-solving, and evaluation (Altinkurt and Yilmaz, 2011). It is a teaching instrument that offers teachers the opportunity to integrate technology into their lessons.

In digital storytelling (Robin, 2008), which is a student-centered practice, teachers give ideas to the students by providing guidance (Vinogradova et al., 2011).

In education, the digital storytelling and writing process is a powerful teaching instrument (Wawro, 2012). Through digital storytelling, students can learn how to write good stories, integrate text and art, and use technology in a creative way (Miller, 2010). In addition, if students pay attention to the writing process, by embracing their stories, they can participate more effectively in the process of creating digital stories and can make the digital story more effective and successful with a good scenario (Xu et al., 2011). Digital storytelling offers many opportunities for teachers and students to listen to the lesson.

The research conducted in this context is important in terms of evaluating the participant views on school safety in terms of contributions of digital stories. It is thought that revealing the opinions of the participants on this subject will benefit the literature. This study is important to reveal the need for an environmentally sensitive, production-encouraging approach to school safety at present and in the future.

MATERIALS AND METHODS

This study relies on qualitative and quantitative research based in a descriptive way. The research has two phases in its nature. In the first phase, the focus of the research aims to increase the awareness of safe schools and to internalize safe school dimensions in special education institutions. In line with the general aim, the research questions of the study are as follows:

1. What are the views of school principals and teachers on special education institutions in terms of safe school?

2. What are the views of students from the department of special education on the digital stories in terms of various variables?

Research Steps on Phase 1 and Phase 2

Phase 1

To achieve the aims of this study, training was provided to the principals and responsible teachers with informative videos and seminars created through the Distance Education and Information Technology Center (UZEBIM). In this phase of the research, the study group consists of the principals and teachers in six special education centers in the Turkish Republic of Northern Cyprus in 2018–2019. In the second phase, the aim of the research was to evaluate the stories in terms of their scenarios as digital stories were created based on the Plotagon animation program and video creation based on Camtasia Studio 2019.

In addition, voices were created based on the artificial intelligence voice applications from the web and also the voice of the researcher. Scenarios were created based on the content of the seminars of experts. Seminars were conducted with students through digital stories. In this respect, the digital storytelling method is also used to enable participants to experience active participation in the teaching process. As one of the aims of this research is to raise awareness of the safe school concept in learning environments, videos were created by experts on the safe school environment, and also digital stories on safe school issues were created for students to increase their awareness in learning at safe schools.

In the research, the following themes are considered as seminars and also for digital stories.

Phase 2

The data were collected through a semi-structured interview form. Qualitative research has been more concerned in terms of the products and outputs as meanings are important in qualitative research (Altinkurt and Yilmaz, 2011). Semi-structured interviews are frequently preferred by researchers because of their certain level of standard and flexibility, eliminating the restrictions in tests and surveys based on writing and filling and helping to gain in-depth knowledge on a particular subject (Karataş, 2015). Regarding the validity and reliability issues of the study, the data collection tool included interview forms, i.e., draft statements that were given to each of the institutions as a pre-application after expert opinions were obtained and necessary arrangements were made. After analyzing the results, the final version of the data collection tool was developed. The data collection tool was prepared as a semi-structured interview form consisting of six basic themes. After the obtained data were pre-applied and the data collection tool was finalized, interviews were carried out with the administrators working in special education centers.

The questions in the interview form were processed in terms of four subthemes (i.e., school, classrooms-workshops, playing-social field, and technological infrastructure). The opinions of the participants were obtained as follows: In "Opinions on Physical and Architectural Safety" theme, there are three subthemes (i.e., student-parent-teacher interaction, special security, and violence-bullying among students); in "Opinions on Evaluation of School Climate and Culture" theme, there are three subthemes (i.e., cleaning and environmental risks, contagious diseases and rehabilitation, and health services); and in "Opinions on Health

Safety" theme, there are "Opinions on Emergencies and Crisis Management," "Opinions on Transportation Opportunities," and "Opinions on Technological Devices and Competence."

In the second phase, digital stories on safe schools were conducted as a course to special education students as a subject of teaching, and their learning and motivation levels were assessed. As **Figure 1** shows there are different types of digital stories designed to teach and inform. After sharing stories in the course, a scale was applied to get reflections of students on digital stories related to the safe school environment. In addition to this, a scale, which was adapted from Ozcan on the Digital Story Evaluation Scale, was conducted on the prospective special education teachers. In addition to a scale, three reflection questions were asked to students to evaluate the learning and motivation factors of digital stories in a safe school environment (Özcan et al., 2016).

While digital stories were being prepared, the following criteria were taken into consideration (Lambert, 2003).

For the effectiveness of the video-based seminars, reflective opinion forms were given to the principals and teachers. On the other hand, the impact of digital stories was also evaluated by using the reflective opinion form to set motivation and make a comparison between traditional learning and digital story-based learning. Digital stories were created based on seminars, and in the form, the following criteria were asked to four experts in educational technology and four experts in language to evaluate the availability of created digital stories to be used in learning.

In this study, it was aimed to increase the awareness of safe school environments and to internalize safe school dimensions in special education institutions through digital stories. Accordingly, as a result of evaluations made with school administrators, the special education institutions were also examined within the scope of the safe school concept and have been determined that there are inadequacies in physical and architectural safety, transportation facilities and technological infrastructure, and deficiencies in terms of school climate and culture, health safety, and emergency and crisis management. In line with the interviews, it has been found out that schools do not have a sufficient level of school safety and that the ministry, school management, and all stakeholders should take preventive measures in coordination among themselves to establish a safe school environment. In addition, it has been understood that the use and dissemination of technology in special educational institutions with individual differences is of great importance in terms of creating an effective learning environment. It is thought that the use of technology is an essential part of education both in responding to the needs of the individual and in solving the problems in their daily lives.

RESULTS

Opinions of the participants were conveyed based on confidentiality and were coded anonymously. Accordingly, to identify the concept of a safe school environment for the participants, coding was performed as "G," and each participant was given a number such as G1, G2, G3, G4, G5, and G6 beside their code. In this part of the research, the questions in the interview form are grouped by themes, and the findings are presented.

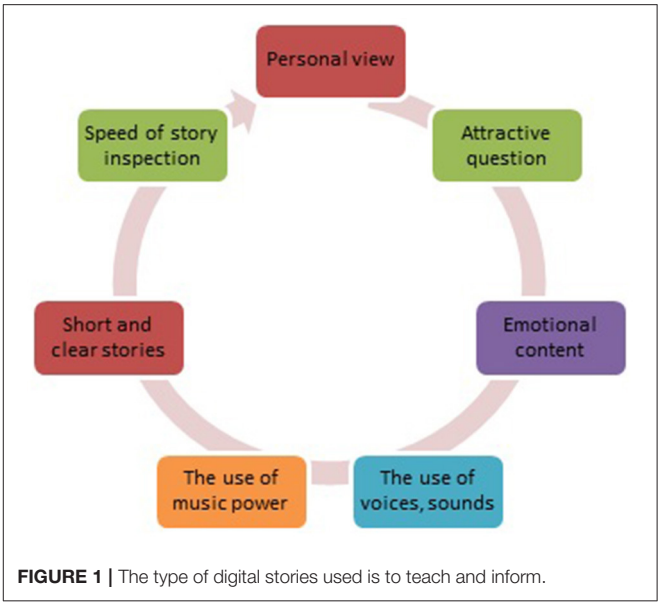

FIGURE 1 | The type of digital stories used is to teach and inform.

TABLE 1 | Views on the physical and architectural location of the school.

Codes	*f*	%
Physical location is convenient	3	25
Architectural location is convenient	3	25
Physical location is convenient, architectural location is not convenient	1	8
Physical location is convenient	2	17
Architectural location is not convenient	3	25

Opinions on Physical and Architectural Safety

There are four subthemes (i.e., school, classrooms-workshops, playing-social field, and technological infrastructure) in the "Opinions on Physical and Architectural Security" theme. The opinions that emerged as a result of the analysis of the answers received in line with the "Opinions on Physical and Architectural Security" theme are as follows:

Opinions on the Physical and Architectural Location Subtheme of the School

The opinions of the administrators participating in the research about the physical and architectural location of the school are shown in **Table 1**.

As shown in **Table 1**, one administrator participating in the study stated that his physical location was appropriate, but the architectural location was not appropriate (G1). Two administrators stated that the physical and architectural location is not suitable (G3 and G5).

The opinions of the administrators reflecting this situation are given below.

TABLE 2 | Opinions on classrooms and workshops, playing-social field, and technological infrastructure subthemes.

	f	%
Opinions on classrooms and workshops codes		
Satisfactory	2	33
Not satisfactory	4	67
Opinions on playing-social field codes		
Satisfactory	4	67
Not satisfactory	2	33
Opinions on technological infrastructure codes		
Not satisfactory	6	100

"Our school is suitable as a physical location, but we are having difficulties because it is two-story as an architectural location" (G1).

"Our school is not physically and architecturally suitable. It is not equipped to meet the needs of individuals with special needs. We are having a lot of troubles" (G3).

Stating that the institution is physically and architecturally appropriate (G2, G4, and G6) argues that the technological equipment is not sufficient.

The opinions of the administrators reflecting this situation are given below.

"It is a great advantage for our school to be on a dead-end street as a physical location. We have an architecturally appropriate building. Suitable for the proper use of each individual. However, technological equipment is not enough" (G2).

The Accessibility Guide prepared by the Izmir Chamber of Architects as a result of detailed research describes the disabled individuals as follows: "people who suffer from disabilities due to the lack of suitable facilities in their use of buildings designed for general needs due to their physical deficiencies." Especially, the institutions where individuals with special needs are educated should have features that meet the needs of all individuals. In this regard, huge responsibility falls on individuals and especially state administrators.

Opinions on Classrooms and Workshops, Playing-Social Field, and Technological Infrastructure Subthemes

As shown in **Table 2**, two of the administrators participating in the research stated that their classrooms and workshops were satisfactory (G1 and G3).

The opinions of the administrators reflecting this situation are given below.

"Our classrooms and workshops are sufficient for our students. It is sufficient because interior designers are prepared in line with the needs of our students" (G3).

Four of the administrators participating in the research stated that their classrooms and workshops are not satisfactory (G2, G4, G5, and G6).

The opinions of the administrators reflecting this situation are given below.

"Our classrooms and workshops are not equipped satisfactorily. Especially, the workshops are inadequate in terms of both equipment and personnel" (G2).

As shown in **Table 2**, four of the administrators participating in the research claimed that their playing-social areas are sufficient (G1, G2, G4, and G5).

The opinions of the administrators reflecting this situation are given below.

"Our playing-social fields are sufficient. We have received support from some organizations as sponsors" (G1).

"Our playground is convenient and safe. We also have a park as a social field and a hall for our events" (G2).

Two of the administrators participating in the research stated that their playing and social areas are not sufficient (G1, G2, G4, and G5).

The opinions of the administrators reflecting this situation are given below.

"Our playing-social fields are sufficient. We have received support from some organizations as sponsors" (G1).

"Our playground is convenient and safe. We also have a park as a social field and a hall for our events" (G2).

As shown in **Table 2**, all of the administrators participating in the research stated that their technological infrastructure is inadequate (G1, G2, G3, G4, G5, and G6).

The opinions of the administrators reflecting this situation are given below.

"Our technological infrastructure is inadequate. It is very important to have a technological infrastructure that our individuals can use according to all disability groups" (G4).

"We just have computers. However, it is not suitable for all types of disabilities. Therefore, it does not meet the needs of the vast majority" (G2).

DISCUSSION AND CONCLUSION

In this study, it was aimed to increase the awareness of safe school environments and to internalize safe school dimensions in special education institutions through digital stories. Accordingly, as a result of evaluations made in cooperation with school administrators, the special education institutions were assessed within the scope of the safe school concept. In line with the interviews, it has been displayed that schools do not have a sufficient level of school safety and that the ministry, school management, and all stakeholders should take preventive measures in coordination among themselves to establish a safe school. In addition, it has been understood that the use and dissemination of technology in special educational institutions with individual differences is of great importance in terms of creating an effective learning environment. It is thought that the use of technology is an essential part of education both in responding to the needs of the individual and in solving the problems in their daily lives.

In this context, it is necessary to give the necessary training to first prepare the technological infrastructure and then to make the best use of technology. As stated in the "Materials and methods" section, the digital storytelling method can be

used as a tool or a mediator in this process of increasing the awareness of safe schools and internalizing the safe school concept in special education institutions. Challenging classwork, technology-driven discourses, and innovative assignments may motivate the students to have positive communication in the classroom (Zahid et al., 2021). The benefits of digital storytelling, on the other hand, can be emphasized as enabling people to transfer information to each other, giving them individuality, increasing the use of technology, and improving critical thinking. As for the digital story types, mostly for educational purposes, the stories prepared for information about a topic are used. In this respect, in this study, according to the aim that digital storytelling mediating to increase the awareness of safe schools and to internalize safe school dimensions in special education institutions, it has been determined that there are inadequacies in physical and architectural safety, transportation facilities and technological infrastructure, and deficiencies in terms of school climate and culture, health safety, and emergency and crisis management. In line with the interviews, it has been displayed that schools do not have a sufficient level of school safety and that the ministry, school management, and all stakeholders should take preventive measures in coordination among themselves to establish a safe school. In addition, it can be stated that the use and dissemination of technology in special educational institutions with individual differences is of great importance in terms of creating an effective learning environment.

Digital stories can be utilized as both teaching and learning tools. Rieger et al. discuss the importance of digital storytelling by underlying the merits of the arts-based research method (Rieger et al., 2018). This method increases the engagement of the participant through multimedia materials to share experiences. Stories are the pedagogical tools to foster learning and motivation. It is noted that they have positive impacts on improving the reading, writing, and creative skills of the students.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Near East University Ethical Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SA: contributed to conception and design of the study and wrote sections of the manuscript. ZA: wrote the first draft of the manuscript. Both authors contributed to manuscript revision, read, and approved the submitted version.

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Impact of Internet Integrated Financial Education on Students' Financial Awareness and Financial Behavior

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In daily life, most people engage in money-related behavior. Adequate financial knowledge is required to successfully manage tasks, such as daily expenditure and the transformation of assets or debts, small, or large. However, the extent of financial knowledge may vary between individuals. With inadequate financial knowledge, people may easily fall into financial difficulties without having sufficient knowledge to redress them. A total of 217 students from departments of finance in universities in Fujian completed an 18-week educational course delivered *via* the Internet on integrated financial education (5 h per week for a total of 90 h). The conclusions were as follows: (1) The Internet can be used to provide education on making ends meet, cutting costs, and increasing profits. It is suitable for beginner students and new graduates who are rapidly accumulating money management experience. (2) Knowledge provided in the course includes the causes of investment, comprehensive changes in the market, unexpected risks, and wrong decision-making. As such, education provided through the Internet can assist in the teaching of money management and investment. (3) Providing teaching on integrated financial education through the Internet avoids the pitfalls of getting lost in the real-world investment market. We expected to cultivate students' finance-related knowledge, skills, and attitudes through internalization of the financial literacy of money management.

Keywords: internet, financial education, financial awareness, financial behavior, knowledge experience

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INTRODUCTION

Equal importance should be given to financial education as already given to language, mathematics, sciences, and humanities. Money-related behavior is for most an essential component of life, ranging from the management of daily expenses to selling and buying large financial assets. Management of both assets and debts requires financial knowledge, but for some this knowledge may be inadequate. When financial knowledge is inadequate, people can easily fall into financial difficulties without the knowledge or insight required to address these difficulties.

A key factor of poverty is having imbalanced finances or "not making ends meet." To solve this problem, financial education can be used to guide individuals in acquiring wealth through financial management, with the central idea of "creation." Financial pressure caused by excessive consumption could be reduced by adjusting the concepts of income and expenditure through the consideration of items and labor. Surplus could be directed toward suitable investment using risk control to increase income and to gradually increase non-labor income through such investment tools. In the early stages, this could be the income source for the family who can gradually achieve financial freedom and alleviate poverty by using their non-labor income to pay all their expenses. People stress about financial freedom because the value would be enhanced when they do not directly work for money.

In the current study, the Internet was applied to study the correlations between financial education, student financial cognition, and financial behavior. We expected to cultivate and change students' existing concepts of income and expenditure, establish a better understanding of assets, debts, and cash flow, adjust students' personal financial structures, and reinforce awareness of risk management in investment.

LITERATURE REVIEW

Scherer et al. (2019) discussed different teaching methods for delivering financial education and the effectiveness of these. He showed that financial education can positively enhance students' financial knowledge. An interview with teachers after completing a course also revealed an important role for the cognition of financial education and enhancement of the understanding of the financial education curriculum. Gentina et al. (2018) demonstrated that people with financial education can show a final wealth difference up to 30–40%. In other words, an individual can acquire short-term and long-term real gains through financial education.

Another study demonstrated that people without financial education or training are more likely to lose in the investment market. It is common for people lacking the basis of financial education and literacy to accumulate many experiences of failed investment, including high borrowing costs or increasing unnecessary expenses, rather than cultivating long-term and stable investment habits.

Hanson and Olson (2018) indicated that financial cognition broadly affects financial behavior, and as such the enhancement of financial cognition provides significant improvements in personal financial management. Taking the example of pension planning, financial cognition has been found to be an important factor in people engaging in financial behavior and experiencing benefits from financial services. In particular, Hert et al. (2012) stated people living in urban areas can acquire various saving products, financing products, and financial loan channels. Nevertheless, the middle classes tend not to effectively use such financial services, primarily due to a lack of financial cognition. Moreno-herrero et al. (2018) revealed that modern people's financial behavior does not lead to the most appropriate financial decisions, including those relating to mortgage loans, the planning of loan repayments, the financial terms required for retirement, property mortgages, chattel mortgages, and interest payments, and the repayment of principal.

Looking at the financial socialization of college freshmen, Moreno-herrero et al. (2018) analyzed the role of parents, past working experiences, and learning experiences in financial education at school with structural equation modeling. The researchers found that three factors could predict financial behavior. Parents' past working experiences together with the quality of their relationship and communication with their children, and having learning experience in financial education at school, presented the greatest benefits.

Brent and Ward (2018) proposed that inadequate financial behavior would induce people to enhance their financial knowledge. Therefore, the effectiveness of financial education depends on previous financial behavior and insight into that financial behavior. Granić and Marangunić (2019) indicate that current research stresses the effect of financial education on financial decisions and the poor population in developing countries based on random control. Their results reveal that effective financial education leads to improvement in financial behavior.

HYPOTHESIS

From the above literature, the following hypotheses were inferred.

H1: There are positive relationships between financial education and financial cognition.
H1-0: Financial education does not show a significant and positive relationship with financial cognition.
H1-1: Financial education reveals a remarkable and positive relationship with financial cognition.
H2: There will be positive relationships between financial cognition and financial behavior.
H2-0: Financial cognition does not appear a notable and positive relationship with financial behavior.
H2-1: Financial cognition reveals a significant and positive relationship with financial behavior.
H3: There will be a positive relationship between financial education and financial behavior.
H3-0: Financial education does not present a notable and positive relationship with financial behavior.
H3-1: Financial education shows a remarkable and positive relationship with financial behavior.

MATERIALS AND METHODS

Operational Definitions

Financial Education

Chou and Chan (2018) proposed that financial education consists of three dimensions: degree of awareness, knowledge experience, and ability practice.

Financial Cognition

Lusardi (2019) proposed that financial cognition contains the following dimensions: cutting costs and increasing profits, investment decisions, and good habits.

Financial Behavior

Miller and Xu (2019) proposed that financial behavior should be measured with a single dimension.

Research Sample and Questionnaire

A total of 360 questionnaires were distributed to students in departments of finance in universities in Fujian. A total of 265 valid copies were returned, representing a retrieval rate of 74%.

Reliability and Validity Testing

Validity refers to the extent that a measurement tool measures what the researcher really wants to measure. The assessment of validity generally comprises the evaluation of content validity, criterion-related validity, and construct validity. The questionnaire items used in this study were taken from those used in previous domestic and international studies, suggesting that the questionnaire holds certain content validity.

The overall structural causal relationship results revealed that the overall model fit reached a reasonable range in demonstrating favorable convergent validity and predictive validity. Item-to-total correlation coefficients were used to test the construct validity of the questionnaire. The correlation coefficients were all higher than 0.7, revealing a certain degree of construct validity.

To further understand the reliability and validity of the questionnaire, Cronbach's αs were calculated. As higher αs reflect better reliability, the measured Cronbach's α in this study of 0.75–0.90 reflects acceptable to excellent reliability.

TABLE 1 | Linear structural model analysis.

Evaluation item	Parameter/Evaluation standard		Result	*t*
Preliminary fit	Financial education	Degree of awareness	0.714	9.62**
		Knowledge experience	0.736	11.16**
		Ability practice	0.757	12.62**
	Financial cognition	Cutting costs and increasing profits	0.722	10.43**
		Investment Decision-making	0.743	11.87**
		Good habits	0.762	14.58**
Internal fit	Financial education→financial cognition		0.846	31.56**
	Financial cognition → financial behavior		0.875	47.15**
	Financial education → financial behavior		0.825	23.77**
Overall fit	X^2/df		1.637	
	GFI		0.964	
	AGFI		0.931	
	RMR		0.005	

**$p<0.01$.

TABLE 2 | Hypothesis tests.

Research hypothesis	Correlation	Empirical result	*p*	Result
H1	+	0.851	$p<0.01$	Supported
H2	+	0.824	$p<0.01$	Supported
H3	+	0.836	$p<0.01$	Supported

RESULTS

LISREL Indicator

The research data are presented in **Table 1**. The preliminary fit, internal fit, and overall fit of the model are explained as follows.

Table 1 shows that the three dimensions of financial education (degree of awareness, knowledge experience, and ability practice) could significantly explain financial education ($t>1.96$, $p<0.05$). The three dimensions of financial cognition (cutting costs and increasing profits, investment decision-making, and good habits) could remarkably explain financial cognition ($t>1.96$, $p<0.05$), and the single factor of financial behavior notably explained financial behavior ($t>1.96$, $p<0.05$). Thus, the overall model presented a good preliminary fit.

In terms of internal fit, financial education was positively and significantly correlated with financial cognition (0.846, $p<0.01$). Financial cognition was positively and significantly correlated with financial behavior (0.875, $p<0.01$), and financial education was significantly and positively correlated with financial behavior (0.825, $p<0.01$). Therefore, H1, H2, and H3 were supported.

The overall model fit standards, $\chi^2/df=1.637$, were smaller than the standard 3, and RMR = 0.005 revealed the proper results of χ^2/df and RMR. Furthermore, Chi-square is sensitive to sample size, and therefore, it is not suitable for directly judging the model fit. However, the overall model fit standards (GFI = 0.964 and AGFI = 0.931) reached the standard 0.9 (the closer GFI and AGFI are to 1, the better the model fit) such that the model presented favorable fit indices.

The research results in **Table 2** reveal a notable and positive relationship between financial education and financial cognition (0.846**) that H1-0 is rejected and H1-1 is accepted. H1 is therefore supported. Financial cognition appears a significant and positive relationship with financial behavior (0.875**) that H2-0 is rejected and H2-1 is accepted. Apparently, H2 is supported. Financial education reveals a positive relationship with

financial behavior (0.825**) that H3-0 is rejected and H3-1 is accepted. Accordingly, H3 is supported.

DISCUSSION

Financial education can be provided by teachers or professional teachers through a combination of systematic teaching and the application of materials, and teaching aids to advance education, knowledge, and skills in using money or resources. Nowadays, money is not referred to as the representation of money in general but is one of the value exchange tools. Stocks, funds, futures, insurance, automobiles, jewels, real estate, and enterprises are valuable; they are the extension of commodities. Financial education, therefore, is the education of exchange ability. By schools planning school-wide or teachers designing class financial education activities, the design of integrating integrated curricula into teaching or applying flexible time to the practice could enhance the extension of financial education curricula and avoid time shortage. Besides, Fox et al. (2005) mentioned that well applying teaching resource websites for financial education could help teachers to effectively promote financial education and financial literacy. Insisting on the idea of resource sharing to establish the material sharing platform in schools, the teaching content could be expanded and updated at any time to enrich teachers' financial literacy. Moreover, the teaching content should be combined with students' real-life experience to cultivate students' financial behavior and stress on the practicality in life to induce students' learning interests and teach students financial knowledge and financial behavior. Fernandes et al. (2014) in his correlational studies that measure financial literacy finds stronger associations with financial behaviors. Teachers, on the other hand, should well-utilize various channels as well as actively and positively enhance personal financial education knowledge and skills. In addition to study activities conducted by education-related units, teachers could participate in activities help by private groups and banks, read books, newspaper, and magazines, browse the Internet, and converse with professional peers to absorb financial knowledge and enhance personal financial literacy.

CONCLUSION

The current findings show that financial education can enhance people's financial knowledge, improve people's ability to comprehend investment markets, teach people how to diagnose personal financial health, and cultivate a lifelong interest in the study of money. Financial statement is the most important issue in financial management. People generally agree with the importance of financial reports, but most people would give up due to the dullness and complication. Financial education creates personal financial statement covering balance sheet, income statement, and simple cash flow statement for people learning the process to make financial reports for further application to daily life so as to reduce pressure of making financial reports. In other words, people who have obtained a basic financial education may more readily comprehend financial cognition and not get lost in their financial behavior. Applying money and/or capital to financial investment with inadequate financial knowledge or financial cognition would lead to difficulty in controlling the risks in the investment market and increase the likelihood of money loss. Although financial education is emphasized in various industries, the concept of financial education is currently still only theoretical. The provision of a simulated financial management model with the characteristics of educational entertainment for students learning about financial statements and obtaining related financial knowledge and skills until now has been scarce. Financial education cultivates students' educational spirit of building the ability of digital management of financial structure, carefully planning the adjustment of income and expenditure in financial statements, and authentically experiencing the situations of living within the means and cutting costs and increasing profits. It is the education suitable for beginners or fresh graduates rapidly accumulating financial experiences.

Learning with the assistance of tutors and teachers would present better learning effectiveness. The systematic cultivation of teachers could rapidly establish improved concepts of money, enhance national financial cognition and ability, change financial behavior and enhance investment effectiveness, reduce the wealth gap caused by inadequate knowledge, and further move toward the goals of national financial health and average prosperity.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The research protocol was approved by the Ethical Committee of the I-Shou University, Taiwan. Written informed consent was obtained from all the participants.

AUTHOR CONTRIBUTIONS

H-CL performed the initial analyses and wrote the manuscript. J-SL assisted in the data collection and data analysis. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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Designing an Effective Learning Environment for Language Learning During the Covid-19 Pandemic

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The rapid development in IT in the twenty-first century have along with the COVID-19 pandemic have had effects on the field of education, with the need to use technology for educational purposes arising. Mobile phones, which hold a more important place than computers, also became a part of education. In today's world, it is possible to access educational content without any limitation of time and space. Individuals who desire to learn a new language but cannot do so due to financial difficulties or free time have moved toward mobile learning methods. "YIT101" is a mobile application designed to teach Turkish as a foreign language independent from time and location and targets basic Turkish A1 level course content. This application enables users to access information when needed and to learn Turkish as a foreign language outside the classroom environment independent from a formal instructor, allowing them to save time.

Keywords: m-learning, mobile application, mobile education, distance learning, Turkish as a foreign language

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INTRODUCTION

The effects of the crisis that emerged following the World Health Organization announcement on 11 March 2020 regarding the COVID-19 pandemic is still being felt by healthcare organizations and in psychological, financial, educational, and social aspects of life (WHO, 2020). The pandemic affected educational systems worldwide and caused universities and schools to close down (Viner et al., 2020). With the closing of schools, policymakers had to make innovations in order to sustain the education systems (Reimers and Schleicher, 2020).

UNESCO (2020) highlighted the importance of formulating innovative solutions regarding the sustainability of education. Policymakers and educators moved toward producing uninterrupted solutions to continue teaching without any disruptions. This is aimed at making the learning process sustainable (Sintema, 2020). As opposed to the face-to-face educational practices implemented worldwide, the opportunity to use e-learning and m-learning practices as a solution (Babu and Sridevi, 2018) and the main learning source came up (Chun et al., 2021).

Although e-learning was not even on the agenda of many institutions before COVID-19, virtual classrooms and platforms were established globally with the pandemic outbreak. There have been studies on which platforms will be used in education, how the teachers will be supported for e-learning practices (Lockee, 2021), how people without Internet access will be reached (Dhawan, 2020), and how learning will be evaluated (Blume, 2020). Relevant research shows that ubiquitous learning would become the main structure of learning shortly as its functionality will increase with

the new technologies and systems (Miah et al., 2020). Mobile learning is a style of education that is independent of time and space (Daud et al., 2021), gives learners access to information at all times, and offers equal opportunities (Kob et al., 2020). Self-learning ability is an important factor in the effective implementation of the learning process through mobile applications. Self-learning abilities can be improved by increasing learners' motivation. Gamification is an education system that aims to increase learner motivation, establish a learner-centered learning setting, involves the student in the process, sets various competitive factors, and achieves learning objectives (Faune, 2021).

Considering foreign language education, it is argued that individuals' interest and concentration rate and their motivation have significant effects on their academic achievements (Denden et al., 2021). If students have fun, get excited, and are motivated during the foreign language learning process (Mustiarini, 2021), the lesson content would become more meaningful and permanent for them.

There have been many scientific studies in recent years on mobile and gamification technologies in foreign language education (Arce and Valdivia, 2020). Based on the given information, it is noted that the use of technology in foreign language education enables learning toward the target language and significant improvements in motivation. It can also be said that the spread of gamified mobile technologies in foreign language teaching would both contribute to the learning process and speed up the process of reaching the desired level.

Additionally, benefitting from mobile technologies in foreign language education is still relevant and current in the field. Mobile-supported learning is mainly observed to contribute to foreigners' listening and speaking education throughout the foreign language learning process (García Botero et al., 2019).

However, there are various challenges in helping foreigners gain the desired basic language skills through the "Turkish as a foreign language" education being offered within the country and abroad (Amalia, 2020). One of the most common examples of such problems is the decrease in students' motivation to learn certain sounds of the language and writing (Sengül, 2014). Another problem is the lack of use of technological innovations in Turkish language teaching.

Various studies from the literature (Zhang and Zou, 2020) highlight the effectiveness of using mobile technologies in foreign language education. The review of relevant literature revealed a limited number of studies on mobile application technologies in teaching Turkish as a foreign language. Also, no studies have been found on gamified mobile applications for teaching Turkish to foreigners in the Turkish Republic of Northern Cyprus. In this context, it becomes evident that there is a need to fill these gaps in the relevant literature.

In light of all this information, this study aimed to develop a mobile e-learning application that would support the gamified ubiquitous learning model by increasing learners' interest and concentration through mobile technologies, helping them learn a language while having fun, and improving their language skills. The study's main purpose was to design and develop a gamified mobile application for university students within the context of the Turkish Language for foreigners.

Learning management systems and e-learning platforms helped to ensure the monitoring of all kinds of tasks regarding learning, (Izumi et al., 2020) had fostering (Ul-Ain et al., 2016) and positive influence on the learning processes (Sáiz-Manzanares et al., 2020).

METHOD

As a research model preferred in material development processes, a design-based research method was adopted in this study. The design-based research method concentrates on design and studying all the designed innovations (Design-Based Research Collective, 2003).

The developed designs need to be continuously implemented for students and re-structured based on their needs. The YIT101 application explicitly designed for Teaching Turkish as a Foreign Language is prepared for the Android platform. The Android platform is globally more popular and used more frequently than other platforms due to its flexibility. According to Statita's data from 2021, Android worldwide use was 71,93%. Also, global design principles and design-based research model guidelines were followed while designing and developing applications.

Data Collection and Analysis

At this stage in the study, first, interviews were conducted with experts who teach Turkish as a foreign language, and the challenges in gaining the four essential skills in language learning were identified. Experts, education technologists, and student opinions were consulted throughout the development process of the application. Semi-structured interview forms were used in order to collect students' views regarding the development of the application. The interviews were conducted with 10 students who participated in the development stage. The researcher conducted the interviews at each stage after the students used the application. The development phase of the application lasted for 12 weeks in total. The following questions were posed to determine students' views:

What are your views regarding the download of the application to your phone and the sign-up process?
What are your views regarding the menu and the content of the application?
What are your views regarding the colors and visuals used in the application?
What are your views regarding the pronunciation activity in the application?
What are your views regarding the listening activity in the application?
What are your views regarding the writing activity in the application?
What are your views regarding the leadership table in the application?

A descriptive research method was adopted to analyze the interview responses used in the study (Strauss and Corbin, 1990). Based on this method, responses were categorized and placed under themes. The application's content was developed according to the information found in the coursebook traditionally used by the students (Istanbul Turkish for Foreigners Coursebook A1).

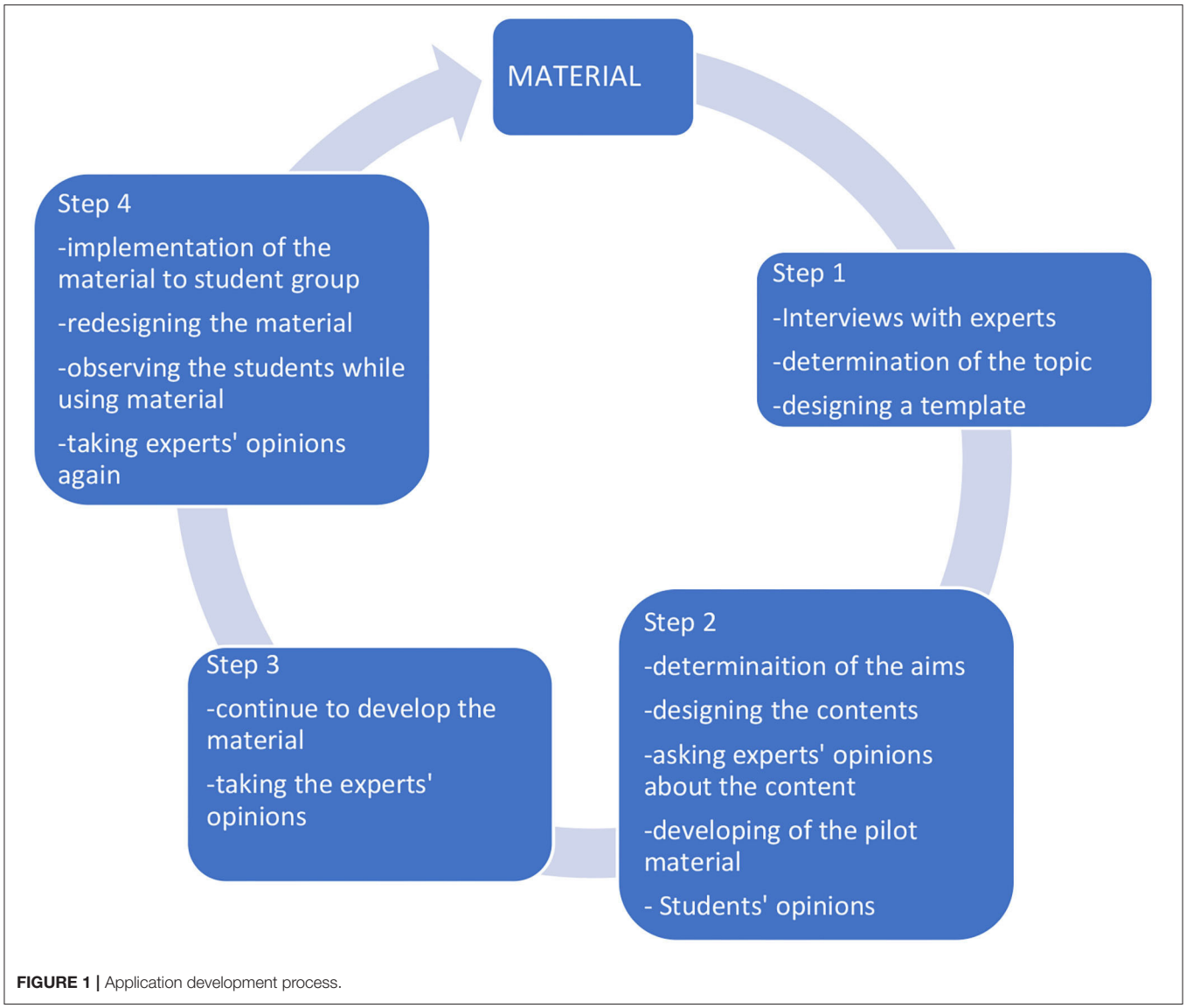

FIGURE 1 | Application development process.

Application Development Process

The development process of the application is summarized in **Figure 1**. It also presents the details of all the steps taken at each stage of the cycle. The application was gradually developed, and regular studies were conducted with the students. Questions emerging at the end of the process were analyzed, the then the application was improved and presented to students to use again.

Mobile Application Development Tools

YIT101 application was developed on a device with Windows 10 operating system. Firebase database technology offered by Google was used on the side of the server to store the data. The exact device test of the application with the devices in all dimensions of the emulator was done using a mobile device with an Android operating system.

RESULTS

A needs analysis was conducted before the design and implementation processes of the study in order to determine which topics and purposes the Teaching Turkish as a Foreign Language application would address. An interview form consisting of 10 questions was implemented to the experts who teach Turkish to foreigners in Northern Cyprus and educational technologists.

The needs analysis results indicated that experts generally believe that the YIT101 application would effectively support international students while learning Turkish and that the experts are inclined to take an active part in this process. When experts' use of mobile devices for educational purposes was examined, it was observed that they were mainly used for material sharing (instructional videos or documents), dictionary use, and communication.

The field experts reported that, due to the limitations of the current Turkish language education practices, educational materials developed for this purpose would be beneficial. The application should be designed for the basic needs and characteristics of the learners. They also stated that there are applications for the Turkish language on Google Play but these are not suitable for those learning it as a foreign language. Educational technologists highlighted that the Turkish as a

FIGURE 2 | Main menu of the application.

Foreign Language Education (YIT101) application needs to have features that would increase learners' motivation. The field experts who are teaching foreigners the Turkish language through distance education listed the topics they need help with the most at Turkish A1 level and thus should be targeted in the application as The Alphabet, Sound Formation, Meeting and Greeting, Plural Form, Question Tags, Personal Pronouns, Demonstrative Pronouns, Possessives, and Numbers.

Step 1

As stated before, the mobile application was developed based on the regular feedback received.

During this process, the content and usability of the application are evaluated based on field experts' opinions. Interviews were conducted with the field experts, and their views were collected regarding the mobile application. As a result of the interviews, it was decided to include gamification elements into the Turkish education application to increase learners' motivation. Screens and contents for all topics were designed, and the object used on the designed pages were decided with the field experts.

Based on the expert opinions, the most suitable mobile application was written over the AndroidStudio platform using Kotlin and Java software languages. YIT101 application is an Internet-based application; thus, it requests permission to access the Internet during the setup and later when using the application. It informs the user with a warning notification when the device has no Internet connection, and the application cannot be used when the device has no Internet access. Then, the users are required to give microphone access permission to use the pronunciation and speaking activities of the application. This permission is needed for Google's Text-to-Speech API. SplahsScreen from the screen was used while loading the needed data during the opening of the application.

Revisions After Feedbacks

- From the gamification elements decided during the interviews with the field experts and educational technologists, features of the leader board and points were added to the application.

As shown in **Figure 2**, visuals to help understand the content were added to the menu, which included the content.

Figure 2 shows the main menu of course content prepared by taking the topic and curriculum into account. The users can begin with a topic of their choice and learn at their own pace. Also, they can check which level they are at with the level feature added as another gamification element. The two icons located at the bottom are for the leader board and settings menu, respectively. The application logo was resized and set for all Android versions. Google Crashlystic was used to check and manage the potential errors during the use of the application.

Step 2

The success of a mobile application depends on to what extent the users internalize all features of the application and how much benefit they receive from these features. A well-designed user interface would both help internalize the topic earlier, and increase the application-user interaction (Invonto). There is visual and audio guidance in addition to the written guide to help students learn. Nevertheless, the students reported that clearing the scoreboards at specific intervals and making the main menu more interesting would be good improvements.

Revisions After Feedback

- Scoreboards are cleared weekly via the Google Cloud function (**Figure 3**). The application includes users' weekly scores table. This part of the scoreboard is cleared once a week to increase the competitiveness feature of gamification. There is also a list of the total scores received by the users. The full scoreboard is not cleared in any way. It presents the accumulated points received by all the correct answers given by the users.
- Pronunciation check activity (**Figure 4**) was added for all topics. This helps learners, in the pronunciation section of the application, to check learners' pronunciation of the words and sentences taught at the end of each activity.
- Text-to-speech feature was added to help learners listen to the audio of the texts.
- Putting the dialogue in the correct order activity was added with the drag and drop technique. This added variety to the application and increased the number of the acknowledged scientific methods used in language learning.

Step 3

Once the students touch the correct answer, a visual reinforcer such as "correct" or "bravo" appears on the screen along with a verbal reinforcer. However, as the field experts reported that the verbal reinforcer would distract the learners, they suggested adding a sound effect. To ensure learning, the wrongly answered questions are presented to the students at the end of the activity again so they learn the correct answer.

Revisions After Feedback

- Verbal feedback was replaced with sound effects.
- All topics were fostered with visuals.

Step 4

A significant part of the application was completed and downloaded to the learners' phones at this stage. The students were asked to use the application for two weeks as part of the YIT101 course. The final opinions were collected from the students and the field experts at the end of the two weeks. The feedback from the students showed that the students with e-mail accounts other than Google experienced problems while entering the system as all users are required to sign in with their Google accounts. The students also suggested that the gamification elements create a competitive setting and continue learning to beat their friends.

Revisions After Feedback

- The students were given the option of using a different e-mail address to enter and sign in to the application. Hence, individuals without Google accounts could also easily use the application.
- Settings window (**Figure 4**) was added to the application. The users were allowed to turn off the sound effects used for correct and wrong answers and the on-touch vibration of the

FIGURE 3 | Score board.

FIGURE 4 | Settings menu.

application from this window. Thus, the users could study in settings when they need to be quiet and save on battery life during more extended study periods.

- It was decided to use customized sounds in the listening and other sections; so, the sounds were changed.

Upon completing the necessary evaluations and arrangements, the final version of the application was uploaded to Google Play.

DISCUSSION AND CONCLUSION

Foreign language learning is ensured by improving reading, writing, listening, and speaking skills (Darancik, 2018). A variety of mobile applications, either for reasonable prices or free, are designed to improve these skills. This study aimed to develop a gamified mobile application to foster individuals' learning of Turkish as a foreign language. The education of students learning Turkish as a foreign language necessitates the use of applications that are tailored for individual learner differences, current student profile, supported by technology, create independence of time and space, help students access information at all times, and give equal opportunities in education (Kob et al., 2020). Design-based research methods were preferred at the first stage of the study, the software development phase. Based on user opinions, it was concluded that the design of the YIT101 application, which was developed through a design-based research process, was found to be satisfying, user-friendly, and filled with valuable content. Special attention was paid to making the application easy to understand and use in its visuals (colors, drawings, text, photographs, etc.). Although the dimensions of the objects are different from real life, they should be used in an appropriate and understandable scale on the screen (Çiloglu et al., 2021);

otherwise, it may result in a conflict on the part of the students. In this regard, it is noted that easy, understandable, and simple materials need to be developed (Evren, 2016). As the building block of foreign language education, vocabulary learning has become rather practical and easy with mobile language learning applications (Kacetl and Klímová, 2019). An important method in ensuring a fun and continuous learning is to gamify the learning process. Thus, gamified mobile applications have an important place in language education (Sen, 2019). The application developed based on typing and writing would then increase the memorability of the learned vocabulary by using reading, writing, listening, and speaking features together. The suggested application educated the user with more than more sensory organs and taught longer-term vocabulary (Kuşçu, 2017), which increased the variety offered and improved memorability.

When the process outcomes were reviewed after developing the material, different activities such as drag and drop, multiple choice, pronunciation check, and ordering the dialogue were added to the activities as a variety to the written or typed activities. This enabled users to stimulate reading, writing, speaking, and listening, as the four basic language skills. Another decision made within the application was to involve gamification elements in order to increase students' motivation. Scoring and leadership list systems were used in the application to increase and achieve the competitive factor as one of the gamification elements. It is believed that this would increase the competition among students and encourage long-term, more permanent learning. When continuing to review the outcomes, it is seen that more accurate and understandable reinforcers need to be given to the users. If the reinforcers given at the end of the activities are not suitable, they might distract the learners and not trigger the necessary motivation. It was thought that presenting learners with the questions they could not answer correctly only once would not sufficiently reinforce the topic and so aimed to be reinforced by asking them again at the end of the activity. It was concluded that visuals and different sound effects as reinforcers would be crucial for motivation. One of the most basic principles of mobile application, without a doubt, is to give learners freedom (Altuntaş, 2017). In this regard, there is a need for settings panels to help users turn off the sound and vibration, considering that they might want to or in settings where they cannot use the application with sound. This way, the learners can study in a setting where they need to be quiet and save on battery life to study for more extended periods. If the designed applications would require the users to set up profiles, they need to consider using different e-mail address accounts. The users should be able to set up their accounts with different e-mail addresses.

In conclusion, this study emphasizes the issues to be considered in terms of content, usability, and interaction while developing interactive mobile application materials for students learning Turkish as a foreign language. The international literature includes many studies on mobile technologies in foreign language education, especially English language education. However, the number of practices and studies for the Turkish language within TRNC and Turkey was insufficient. It is hoped that the developed application would contribute to this gap and provide guidance for future studies.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation. All participants gave written informed consent in accordance with the Declaration of Helsinki. The study was approved by the Scientific Board of Near East University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

OB designed and carried out the study and contributed to the analysis of the results and to the writing of the manuscript. FF designed and carried out the study, collected data, and contributed to the writing of the manuscript. FO contributed to the analysis of the results and to the writing of the manuscript. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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Children's Motivation to Learn at Home During the COVID-19 Pandemic: Insights From Indian Parents

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The COVID-19 pandemic has forced millions children worldwide to learn at home. Recent reports showed that this had a negative impact on children's motivation to learn. The current study investigated what factors were associated with a child's motivation during the pandemic and how parents motivated their children to learn at home. A total of 1,041 parents from India filled out a close-ended survey to help shed light on the issues. The results confirmed that children in India were significantly less motivated to learn during (vs before) the pandemic and revealed that a child's motivation to learn at home was associated with multiple factors, such as household income, parents' employment status, child's academic achievement, and parent's enjoyment in homeschooling. In contrast, the availability and usage of various technological resources bore no relation to a child's motivation. Finally, the current data showed that Indian parents most frequently used TV time, words of encouragement, and play/game time as motivators; the least popular motivators were money, new toys, and physical punishment. Exploratory analyses showed that a child's motivation to learn tended to be lower when parents used more physical punishment to "motivate" their children. These findings were discussed in relation to public/education policies.

Keywords: motivation, COVID-19, learning, survey, India, parent, children

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INTRODUCTION

On January 30, 2020, the COVID-19 pandemic was declared as a Public Health Emergency of International Concern by the World Health Organisation. Governments worldwide responded to this by implementing travel bans, lockdowns, and facility closures. In 172 countries, schools, colleges, and universities were forced to closed, impacting 98.5% of the world's student population (UNESCO, 2020). To ensure education continues, remote learning at home becomes more than a trend but rather a necessity.

Since the pandemic began in early 2020, much research has taken place to shed light on how parents and children worldwide coped with remote learning. For instance, Mælan et al. (2021) explored how Norwegian students at various levels of academic achievement differed in their remote learning experience; Dong et al. (2020) surveyed how Chinese parents' attitudes towards online learning affected their children's education during the pandemic; Parczewska (2020) investigated how parents in Poland coped with the demands from homeschooling. Although these studies were conducted in different parts of the world, they all noted that school-aged children have difficulty maintaining motivation during remote learning. Similarly, in a survey with 3,000 school-aged students across the United Kingdom, Elevate Education (2020) found that motivation levels plummeted during the national school closures from March to July 2020, with 81% of the

TABLE 1 | Background information of the sample.

Annual household income (USD)	No. of respondents	Highest education attainment	No. of respondents	Number of children	No. of respondents
Less than $10,000	246	Primary school	3	1	476
$10,000–$19,999	214	Some high/secondary school	6	2	509
$20,000–$29,999	150	High/secondary school graduate	23	3	40
$30,000–$39,999	91	Some university or Degree in progress	21	4	10
$40,000–$49,999	75	Bachelor–s degree	531	5	3
$50,000–$59,999	84	Master–s degree	419	>6	3
$60,000–$69,999	46	Professional degree	30		
$70,000–$79,999	42	PhD	8		
$80,000–$89,999	27				
$90,000–$99,999	37				
More than $150,000	9				

surveyed students stating that they felt unmotivated to learn during those months. As suggested by decades of psychological research, motivation is developmentally interlocked with academic achievement throughout an individual's education (e.g., Gottfried, 1985, 1990; Wilkins and Ma, 2003; Aunola et al., 2006; Denissen et al., 2007; Ryan and Deci, 2009; Viljaranta et al., 2009; Garon-Carrier et al., 2016). Despite the importance of motivation, surprisingly little research has directly examined the effect of COVID-19-related school closures on children's motivation or how parents motivated their children to learn during the pandemic. In this paper, I present findings from an Indian survey that aimed to address three research questions, all of which have the potential to inform education policies:

1) Did COVID-19-related school closures reduce learning motivation among Indian children?
2) What factors influenced a child's motivation during school closures (e.g., gender, academic achievement, their parents' employment status)?
3) How did Indian parents motivate their children to learn at home during the pandemic?

MATERIALS AND METHODS

Participants

Over 3,000 respondents from India were recruited *via* Amazon MTurk and Qualtrics Panel. India was chosen as the target country because it was a funder's requirement. After screening out ineligible respondents (e.g., not from India, childless, failed attention checks), the final sample comprises 1,041 Indian parents (N_{MTurk} = 521, $N_{\text{Qualtrics}}$ = 520; 43.9% Female; M_{age} = 33.5, SD_{age} = 5.8). They had at least one child between the ages of 6 and 15. **Table 1** summarises the background information of the sample.

Procedure

Data collection began in mid-March 2021 and ended in mid-June 2021. Respondents received approximately $1 USD upon completion of the survey. Written informed consent was obtained before the survey began (Reference for ethics approval: CUREC1A/BSG_C1A-20-19). The survey was hosted on Qualtrics, and respondents could complete the survey using whatever device they preferred (e.g., mobile phone, tablet, computer).

TABLE 2 | Age and gender distribution of the children being considered in the survey.

Age of child	Number	Children's gender	Number
6	154	Male	613
7	194	Female	423
8	128	Non-binary/Prefer not to say	4
9	87		
10	98		
11	58		
12	88		
13	78		
14	100		
15	56		

Questionnaire

The survey was drafted by the author, reviewed and refined by five other researchers within the Digital Pathways Research Group at the University of Oxford. It was then sent out to 10 parents in the United Kingdom for piloting. The survey is available in the **Supplementary Table S1**, and completion required 5–10 min. If a respondent had more than one child, they were asked to consider throughout the survey the one with whom they interacted the most during the pandemic (See **Table 2** for details of the children being considered). All the questions, written in English, were close-ended. To safeguard data quality, three attention checks were implemented (e.g., "This is an attention check, choose Never"). Failure in any of these checks resulted in immediate termination of the survey, and data from these participants were discarded.

Data Analysis

The survey data were analysed in the R statistical programming environment (version 4.0.3; R Core Team, 2020). The package ggplot2 (Wickham, 2016) was used for data visualisation. The survey was not pre-registered. The data and the R markdown

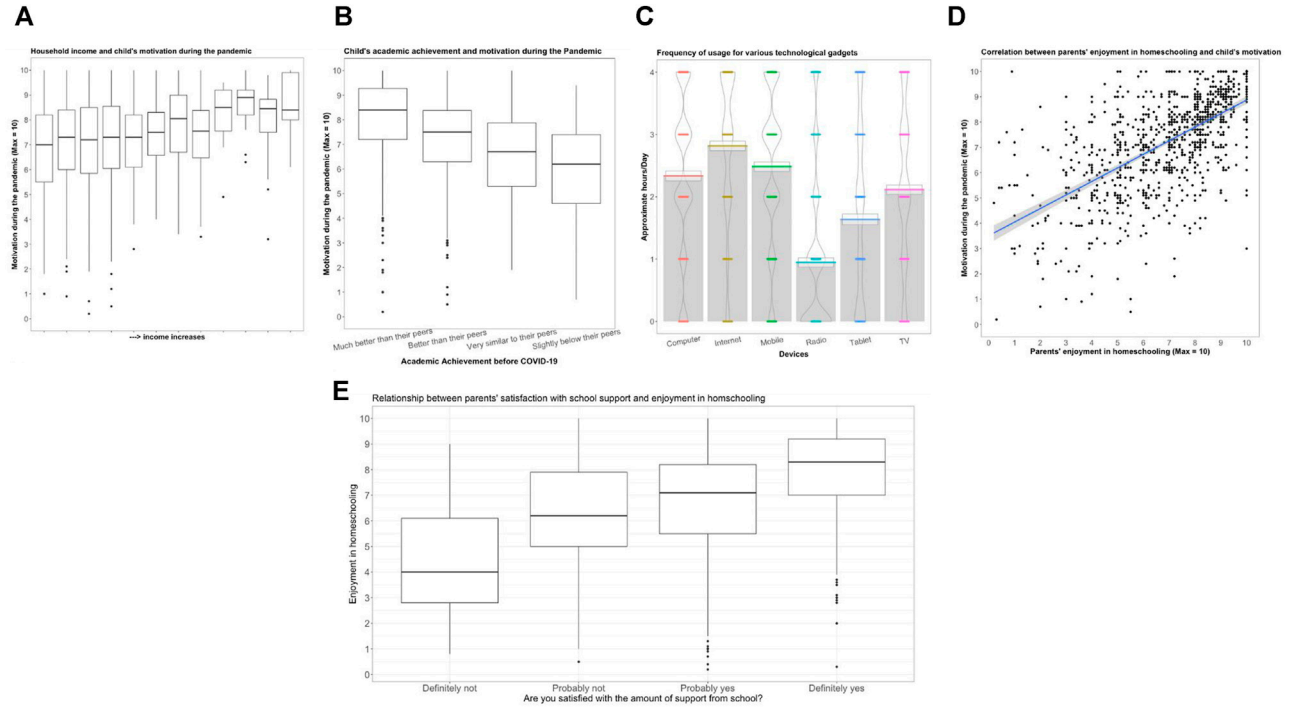

FIGURE 1 | Caption: How **(A)** a household's annual income, **(B)** academic achievement, and **(D)** parents' enjoyment in homeschooling related to the child's motivation to learn at home during the pandemic. **(C)** showed the frequency with which each technological gadget was used by the children to access learning materials during the pandemic. **(E)** showed the association between parents' enjoyment in homeschooling and their satisfaction with the support provided by their children's school.

scripts associated with this study are available on the Open Science Framework. All the linear regressions reported below are simple linear regressions (i.e., only one predictor).

RESULTS

Did COVID-19-Related School Closures Reduce Learning Motivation Among Indian Children?

We asked the respondents to rate their children's motivation levels on a scale of 0 (Not at all motivated) to 10 (Very motivated)—one for before and another for during the pandemic. The mean levels were 7.95 (SD = 1.59) and 7.22 (SD = 1.87), respectively. The difference was significant, as indicated by a paired t-test [t (1,040) = −12.38, $p < 0.001$]. In other words, it is estimated that Indian children were on average about 10% less motivated to learn at home than at school pre-COVID-19. Interestingly, the motivational ratings for before and during the pandemic were correlated only to a modest extent (r = +0.406, $p < 0.001$).

Is Children's Motivation During School Closures Related to

Their Gender?

Four hundred and twenty-three (or 40.5%) of the children being considered were girls while 613 (or 58.8%) were boys. Motivation levels were numerically higher in girls than in boys (M_{girl} = 7.36 vs M_{boy} = 7.15). This was, however, not statistically significant according to an independent t-test [t (881.47) = 1.78, p = 0.075].

Household Income?

Respondents indicated their annual household income among 12 income brackets. **Figure 1A** showed how a household's annual income is related to a child's motivation to learn during the pandemic. A simple linear regression revealed that children from more financially advantaged households are generally more motivated ($ps < 0.035$). However, caution is warranted in interpreting this finding, as our sample is composed mainly of parents from low- to middle-income backgrounds.

Employment Status of the Parents?

Respondents indicated their employment status in the period of March 2020 to June 2020. 698 (67.0%) of them were employed full-time, 142 (13.6%) employed part-time, 48 (4.6%) were housewives/husbands, and the remaining 14.6% respondents were students, unemployed, or self-employed. A simple linear regression showed that children whose parents worked full-time were rated more motivated than those with parents who worked part-time (p = 0.001), were housewives/husbands (p = 0.005), or were unemployed (p = 0.05).

Their Academic Achievement Before COVID-19?

Respondents indicated their children's academic achievement prior to the pandemic among six options: *Much better than*

their peers [290], *Better than their peers* [426], *Very similar to their peers* [246], *Slightly below their peers* [65], *Significantly below their peers* [5], and *Not sure* [9] (Note: numbers in square brackets represent the number of respondents who chose that option). After excluding the 14 respondents who chose *Significantly below their peers* and *Not sure*, a simple linear regression revealed that children with better academic achievement before the pandemic were significantly more motivated during school closures ($ps < 0.02$; see **Figure 1B**).

The Availability of Various Technological Devices?

Respondents indicated what technological devices (e.g., computer, Internet, mobile phone, radio, tablet, TV) their children had access to during the pandemic and how often each of these devices was used by the children on an regular day to facilitate learning: 0, <1, 1–2, 2–4, and >4 h. The data showed that Indian children most frequently used the Internet and mobile phone to learn (see **Figure 1C**). A simple linear regression revealed no evidence that having access to a certain device or having more frequent usage increased motivation to learn in the children ($ps > 0.08$).

How Much a Parent's Enjoyed Homeschooling?

Among the 1,041 respondents, 977 (or 93.8%) of them were involved in homeschooling their children during the pandemic. These parents were asked to rate how much they enjoyed homeschooling on a scale of 0 (No Enjoyment) to 10 (A Lot of Enjoyment), in increment of 0.1. The mean level of enjoyment was 6.98 ($SD = 2.15$). This correlated moderately with their perceived motivation level of their children during the pandemic ($r = +0.619$, $p < 0.001$).

Additionally, I explored whether the level of enjoyment is predicted by how satisfied the parents were with the amount of support provided by their children's schools. The respondents indicated their satisfaction by selecting one of the four options: *Definitely Yes* [325], *Probably Yes* [513], *Probably Not* [88], and *Definitely Not* [33]. A simple linear regression showed that parents who were more satisfied with the amount of school support generally found homeschooling more enjoyable (see **Figure 1E**).

The Number of Homeschooling Hours?

Respondents estimated how many hours a day they spent on homeschooling their children during the pandemic. The average was 3.4 h ($SD = 1.3$). This bears little relation to a child's motivation during the pandemic ($r = +0.168$, $p < 0.001$).

How Did Indian Parents Motivate Their Children to Learn at Home During the Pandemic?

A total of 13 motivators, determined by a pilot study, were supplied to the respondents. They indicated the frequency with which each of them (e.g., TV time, new toys) was used during the pandemic. Six frequency options were available: *Never*, *Once or Twice a Month*, *Once a Week*, *2-4 Times a Week*, *Almost Every Day*, and *Every Day*. **Figure 2** summarises the frequency with which each motivator was adopted. Among all motivators, TV time, words of encouragement, and play/game time (in descending order) were the most popular. On the other hand, money, new toys, and physical punishment were the least popular.

I also explored whether a child's motivation levels during the pandemic was related to the frequency with which each motivator was used. A simple linear regression showed that a child's motivation to learn tends to be higher when parents more frequently used goal setting to motivate their children ($ps < 0.035$). Also, it showed that a child's motivation tends to be lower when more physical punishment was adopted ($ps < 0.02$). The latter echoes with prior evidence that physical punishment can be detrimental to a child's motivation (e.g., Ahmad et al., 2013). Finally, additional analyses found no evidence that the usage of various motivators is related to a child's gender, household income, or academic achievement.

DISCUSSION

Much education research during the COVID-19 pandemic noted that school closures have significantly reduced motivation in school-aged children (e.g., Parczewska, 2021). Despite the importance of motivation in academic achievement, relatively little is known about what factors were associated with a child's motivation during the pandemic or what techniques were adopted by parents to motivate their children. To fill this research gap, a survey was designed and filled in by over 1,000 parents in India. Below, I discuss in turn the key findings from the survey.

First, the current study extended a prior study (Elevate Education, 2020) by demonstrating that children in a developing country also experienced weak motivation during COVID-19-related school closures. This provides evidence for the universality of the issue and highlights the importance of using appropriate measures to combat poor motivation in school-aged children during protracted school closures (see e.g., Mak and Elsherif, submitted).

Second, Indian children from richer households appear to have greater motivation to learn during the pandemic. This might be because more affluent families can provide their children with more educational resources (e.g., books, educational games, online private tutorials), which might, in turn, help sustain the children's interest in learning. Interestingly, Indian parents who were employed full-time were more likely to report greater motivation in their children than parents who did not work or not as regularly. This hints that monetary resources might play a more influential role in shaping a child's motivation during the pandemic than whether a parent has more time to supervise their children.

Third, not surprisingly, children with poorer academic achievement before the pandemic generally have weaker motivation to learn during school closures. This mirrors a recent finding by Mælan et al. (2021), who observed that low- (vs high-) achieving students in Norway generally exhibited lower efforts and self-efficacy throughout the pandemic. Together, these findings highlight that low-achieving students tend to suffer more from COVID-19-related school closures and that these children

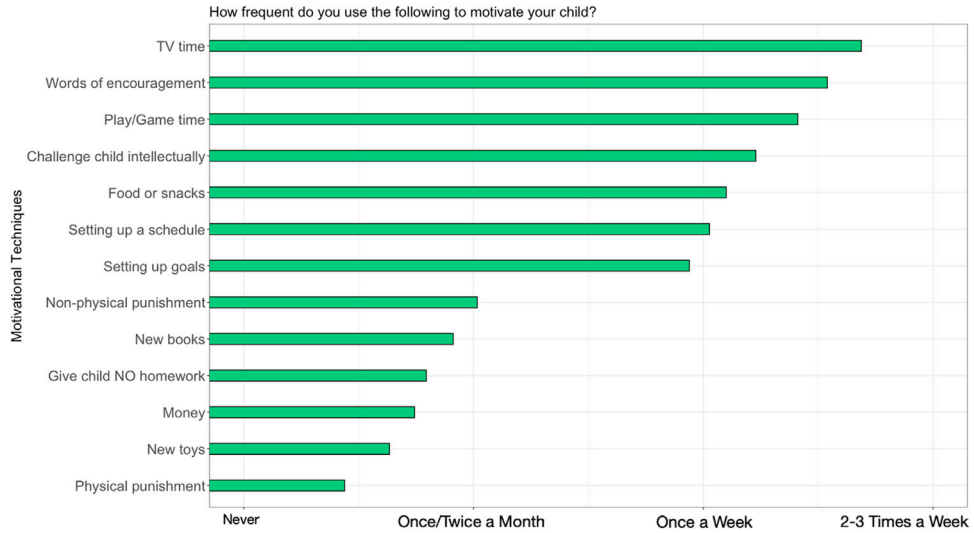

FIGURE 2 | The frequency with which a motivator was used by Indian parents during the pandemic.

may require greater and more frequent assistance from parents/teachers to make progress in their learning.

The current survey revealed that the motivation to learn among Indian children was not related to the availability or the frequency of usage of various technological devices. This means that as long as Indian children have access to some technological resources, their motivation to learn is unlikely to be enhanced by more devices or greater usage. This echoes with the findings by a recent report showing that the hardware is less important than the learning content (Pathway for Prosperity Commission, 2019). Developing countries are therefore better advised to invest in policies that target behaviours, rather than costly and excessive investment in hardware deployment. Indeed, over a decade of evidence from the One Laptop per Child (OLPC) programme supported this view: The OLPC initiative aimed to improve education in developing countries by equipping children with educational devices; however, there was no evidence that such hardware deployment improved education outcome (e.g., De Melo et al., 2014), and in some localities such as Ghana, it even produced unfavourable consequences, such as worsened cultural divides (Steeves et al., 2017). The reasons for its failure are a subject of debate (see Morgan, 2019), but some researchers attributed it to OLPC failing to consider vital factors such as learning outcomes and available resources (e.g., Kaloostian et al., 2020). In short, the current survey adds to the existing evidence base that hardware deployment is unlikely to be a panacea for improving education outcome or motivation levels among school-aged children in developing countries.

Next, a child's motivation to learn during the pandemic was positively related to how much their parents enjoyed homeschooling. Given the correlational nature of this finding, it is impossible to infer any kind of causality. However, there is existing evidence indicating reciprocity between parents' and children's emotional well-being (e.g., Boutelle et al., 2009); it is, therefore, reasonable to argue that a child's motivation influences how much their parent enjoys homeschooling, which, in turn, shapes the child's motivation level. This highlights the need to understand how a parent's experience in homeschooling can be enhanced and facilitated (Thorell et al., 2021). The current survey found evidence that a parent's enjoyment in homeschooling is positively related to how satisfied they are with the amount of support provided by their children's school. This suggests that it might be possible to improve parents' enjoyment if schools could provide timely and sufficient support (e.g., regular homework, learning syllabus). A consequence of this might be increased parental enjoyment, and hence, greater motivation in children.

In relation to the above, the current survey found no evidence that the number of hours dedicated to homeschooling has any association with a child's motivation in the Indian context. This suggests that Indian parents should focus on the quality of homeschooling, as opposed to placing a strict quota on the number of homeschooling hours. Schools may give guidance to parents on how best to routinise homeschooling.

Finally, in terms of motivators, our respondents most frequently used TV time, words of encouragement, and play/game time during the pandemic. The fact that TV time is the most frequently used motivator suggests that governments in India could invest more in educational TV programmes. This will not only increase the prevalence and accessibility of education in India (e.g., Rani, 2006), but it will also give parents the peace of mind that their children are being exposed to TV content that is both child-appropriate and intellectually enriching. On the other hand, the current data showed that Indian parents least frequently used money, new toys, and physical punishment as motivators. Some empirical studies (e.g., Deci et al., 1999; Elbla, 2012; Ahmad et al., 2013) have shown that these techniques often hamper, instead of enhance, children's motivation to learn. And indeed, the data from the current survey showed that a child's motivation level during the pandemic is negatively related to the frequency of physical punishment. Note, however, that it is impossible to tell whether our respondents under-reported the usage of these potentially detrimental motivators, which might be considered socially

undesirable (Grimm, 2010). In addition, despite being the least popular, these motivators are still regularly employed by some respondents. Local governments and schools should consider, for instance, distributing leaflets to parents to educate them on what motivators are better suited for motivating children (e.g., goal setting).

Limitations

The current study focused on one nation (i.e., India), so it remains an empirical question as to whether the key findings apply to a different country. Second, although the current sample size is not small in an absolute sense (i.e., 1,041 Indian parents), it is minuscule relative to the 1.3 billion population in India. This study, therefore, had only scratched the surface, and the results are unlikely to be generalisable to, for example, rural areas in India. Third, while the use of quantitative survey allows a large amount of data to be collected relatively quickly, the current survey did not speak to the qualitative aspect of the issue at hand; future studies should explore how protracted school closures affect students' motivation from a qualitative perspective. Fourth, the current survey only considered a limited number of factors that may influence a child's motivation; future studies can expand the scope to, for example, the role of the digital environment and the skill level of educators (see e.g., Rasmitadila et al., 2020; Toto and Limone, 2021). Finally, the current survey asked parents to rate their children's motivation levels for before and during the pandemic. Undoubtedly, this is subject to recall bias. Future studies may complement parents' ratings with children's.

Summary and Policy Implications

The current survey revealed that Indian children were on average 10% less motivated to learn during the COVID-19 pandemic (vs pre-pandemic). Multiple factors appeared related to a child's motivation during the pandemic, including, but not limited to, household income, parents' employment status, academic achievement before the pandemic, and how much a parent enjoyed homeschooling. Furthermore, the survey found that Indian parents most frequently used TV time to motivate their children and least likely to use physical punishment, which seems to have a demotivating effect on Indian children.

Overall, the current study suggests that 1) students with poor academic achievement and those from low-income families are likely to require greater assistance to catch up and to sustain their motivation. Given this, schools and teachers may consider prioritising these students for intervention if resources are limited. 2) The availability and usage of technological devices appeared to play a limited role in a child's motivation in the Indian contexts; developing countries might therefore benefit more from investment in policies that target behaviours, instead of investment in expensive hardware deployment. 3) Schools should aim to provide timely and sufficient homeschooling support to parents and to give them guidance on the what motivators to use/avoid.

DATA AVAILABILITY STATEMENT

The datasets presented in this study can be found on the Open Science Framework (https://osf.io/8ugs2/).

ETHICS STATEMENT

The study was reviewed and approved by the University of Oxford, CUREC-Social Science Division. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MM designed the survey, collected and analysed the data, wrote the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2021.744686/full#supplementary-material

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frontiers in Psychology

BRIEF RESEARCH REPORT
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The Impact of COVID-19 Instigated Changes on Loneliness of Teachers and Motivation–Engagement of Students: A Psychological Analysis of Education Sector

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Upon the spread of the global pandemic of COVID-19, education was transformed online in an abrupt manner. Amid this change, the education sector did not have room for proper decision-making and understanding of psychological effects. This theoretical analysis aims to contribute to the proposed Frontiers Research Topic, through (a) in-depth analysis of the pandemic status and behavioral psychology and (b) examining educational psychology from the perspective of teachers regarding sudden changes. As a result, implications are suggested based on interviews, linking to extant literature. The current research recognizes the difference between online learning and emergency remote education. While the former comprises prepared means of teaching and assessment, the latter is unaccompanied by such preparedness. Thus, there are variations in the outcomes of learning, motivation, and engagement. Scholars, teachers, deans, and educational managers can benefit from current results.

Keywords: COVID-19, educational psychology, motivation, engagement, university lecturers, learning theories

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INTRODUCTION

With the pandemic of COVID-19 surfaced, its effects were unanimously researched by experts across the world. It has been the core concern of scholars in particular (e.g., Leung et al., 2020; WHO Regional Office for Europe, 2020; de la Fuente et al., 2021). As the occurrence of the pandemic is unprecedented, it is vital that its psychological impacts are examined and understood to provide strategies for better adjusting to the current status quo and aim for resilience for future pandemic-like situations. The current research looks into the psychological effects of the COVID-19 pandemic on undergraduate students from the perspective of teachers. Motivation, engagement, and learning outcomes (e.g., success) are included in this study. Educational psychology can be defined as a subgroup of psychology that specifically addresses education (de la Fuente et al., 2021). Educational psychology entails various aspects, such as the effects of COVID-19 on the development at certain stages (physical, socio-moral, motor, cognitive, and linguistic) (Liu et al., 2020), learning (Cachón-Zagalaz et al., 2020), stress caused by changes for students, teachers, and parents (Valadez et al., 2020), changes in educational contexts, and achievement (Martarelli et al., 2021), and rise of technological means (Obrero-Gaitán et al., 2020).

Within the scope of current research, the education sector and universities specifically were forced to switch traditional in-person classes to online systems. This emergency remote educational format of teaching undeniably has had significant psychological impacts on both teachers and students. This is while online education platforms have been in place for several years, where individuals can take an array of courses and obtain certifications. In this sense, teachers had little-to-no time to prepare for the pandemic to completely change their teaching styles considering learning, motivation, engagement, and educational outcomes of students (Chacón-Fuertes et al., 2020; Daniels et al., 2021). It has been noted in recent studies that the format of education will continue to be online regardless of the motivation for returning to in-person classes (Hyslop, 2020). Notably, both students and teachers are keen to return to the "previous" state. This research investigates the effects of the pandemic (shift to online learning in a sudden manner) on the engagement of students and motivation through the perspective of teachers.

LITERATURE REVIEW

In the context of current research, Achievement Goal Theory (AGT) has been found to be appropriate, when examining the *motivation* of students (Senko and Dawson, 2017). Achievement goal theory is used to theoretically explain changes in attitudes (motivation) of teachers and students in the sudden shift of education format during Covid-19 pandemic (Daumiller et al., 2021). There are two aspects in this regard that are incorporated within this theory, namely, competence and valence. Competence is referred to as the exhibition of the level of competence of an individual compared to peers (performance and mastery goals), which are linked to desirable outcomes from the learning process (e.g., emotions, interest, regulation of self, and strategies of learning). Valence addresses the difference between approach and avoidance of motivation (Elliot, 1999). Behaviors that are the predictors of positive learning outcomes (i.e., learning new subjects) are referred to as approach motivation, while avoidance motivation is a negative form, such as failure (Huang, 2012; Daniels et al., 2021).

The *engagement* of students has been defined as a multidimensional factor that consists of various operations. In this sense, behavior, emotion, and cognition are key aspects (Fredricks et al., 2004). Behavioral engagement incorporates actions, effort, consistency, participation, and positivity within a course (Daniels et al., 2016). Feelings and/or attitudes toward a specific course are referred to as emotional engagement (affective) (Appleton et al., 2008). These feelings can vary from not being interested in high levels of interest in the course. Furthermore, cognitive engagement includes the processes of thought for students regarding a course and its task in an internal manner. Self-directed questions, additional resource findings, and discussion on course material with others are among the factors of cognitive engagement (Daniels et al., 2021). Problem solving, coping strategies, and willingness to learn are also among the dimensions of the cognitive engagement process (Appleton et al., 2008).

It is important to note that other constructs, such as learning, knowledge, skills, and satisfaction, are also vital for the achievements of students (Goegan and Daniels, 2019), especially through information and communication technologies (ICT). As the pandemic shifted the grading system of schools into CR/NCR, studies mentioned that the stress level was reduced as mere traditional factors of success were influenced. Accordingly, the perspective of the success of students has changed, which was observable by teachers during classes. The existence of the positive impact of approach goals on objective and subjective success in academia has been noted in the extant literature (Huang, 2012).

Online learning is special in its features and has its unique methods of instruction, philosophy, and subsequent psychological impacts. According to Korkmaz (2019), online learning is embedded within the premise of Reconstructionism and humanism and is linked to connectivism (Jung, 2019). The objective of online learning is to provide opportunities for learning in an equal manner and to overcome barriers (Korkmaz and Toraman, 2020). In the era of digital advancements, the learning theory of connectivism is explained through globalization, long-term learning, technology, and digital information. It has been noted that various theories are involved in this context that are chaos, network, complexity, and self-organization (Siemens, 2004). These are followed by a framework that can be categorized into different aspects, such as, diversity in opinion establishing learning and knowledge, information sources and their connections shaping learning process, non-human appliances can include learning process, the capacity of learning new things is more significant than existing knowledge of an individual, creation, and maintenance of networks and connections are crucial if learning is to be continuous, the capability of linking different concepts, notions and disciplines, the extent of which knowledge is up-to-date, and learning through the process of decision-making. What is learned and assumed to be correct today may turn to be false in the future due to changes within data. This is an important aspect of learning as it entails the notion of science and scientific learning (Tyson, 2019). In the context of connectivism, it is set that participation is imperative for learning so that teachers can deliver knowledge to students through interactions (Bozkurt, 2014). Collaboration, connectivity, emphasis on students, community, exploration, knowledge sharing, authenticity, and experiences are among the characteristics of online learning from the nexus of educational psychology and learning theories (Mayer, 2019; Weidlich and Bastiaens, 2019). Social, cognitive, and teaching presence alongside communities of online learning and learners who seek to learn internally are also noted in this context (Su, 2016).

Current study takes the aforementioned factors into consideration based on the awareness of teachers and decision-makers upon occurrence of Covid-19 pandemic as changes in education system were abrupt and mandatory. Thus, the perspective of the teachers regarding the engagement of students and motivation is looked into, while the notion of teachers' working in a solidary format (*workplace loneliness*) is assessed. Through understanding these factors and how they have been influenced by the COVID-19 pandemic, implications for

the era after the pandemic can be drawn to assist educators. The use of resources digitally, equipment, internet access, platforms, familiarity, and devices were noted as key challenges for educators (Huber and Helm, 2020; Quezada et al., 2020; UNESCO, 2020). According to Wang et al. (2021), ineffective communication, work-home interference, and workplace loneliness are noted as major challenges for teachers during the COVID-19 pandemic. In the context of current research, workplace loneliness is the situation in which teachers have little-to-no interactions with their colleagues and/or supervisors. This was combined with other restrictions, such as not being able to have social gatherings and meet friends, which further caused loneliness. This factor has vivid effects on well-being and performance at the job (Wang et al., 2021).

Loneliness is defined as a sense of being empty, alienated, and having no particular relationship and linkage with others (Dor-Haim and Oplatka, 2021). It is associated with various negative psychological and organizational outcomes, such as decreased performance, lesser work quality, lowered motivation and commitment, diminished job satisfaction, increased turnover intentions, and reduced well-being (Cacioppo and Cacioppo, 2014; Ozcelik and Barsade, 2018). While the concept of loneliness has been examined in the education sector, this factor and its effect on university teachers after the occurrence of the pandemic have not been overly discussed. Hence, the current research looks into this factor from the perspective of teachers to provide a better understanding of how COVID-19 consequences impacted the well-being and performance of teachers due to perceived loneliness at work during emergency remote education. Studies conducted in the same context have reported negative impacts of loneliness on performance, engagement, job satisfaction, well-being, and functioning (Bakır and Aslan, 2017; Dor-Haim and Oplatka, 2021). This element is addressed in the current research to see if the loneliness of teachers is influential regarding what they perceive of engagement and motivation of students.

Motivation is complex by nature and has been studied extensively in the field of psychology and other relevant disciplines. It impacts behaviors, thought processes, and the duration of time individuals dedicate to their tasks (Urdan and Schoenfelder, 2006). In the field of academia, motivation for students implies a continuation of learning and combined joy (Zimmerman, 2008). This is while lack of motivation leads to failure in the academic field. Various factors can impact the motivation of learners (e.g., teachers' approach and attitude, expectations, family, social values), which have direct effects on the performance and participation of students in classes. Social cognitive theory (SCT) and self-determination theory (SDT) are used as motivational theories (Bandura, 1989). SCT is also referred to as social learning theory (SLT), which includes the social context of reciprocation, interaction, and learning for an individual in given environments and performed actions. Social reinforcement both externally and internally is within SCT, with added emotions and cognitive abilities to SLT. In other words, the actions, feelings, and thoughts of an individual impact other in the given social setting (Oden et al., 2019). Teacher interaction, student expectations, and descriptions of learning quality are among the social-contextual factors impacting ones' cognition in academia (Bandura, 1989). Classroom and school environments and individual interactions with these settings shape the motivation of a student. Autonomous motivation, controlled motivation, and a-motivation are noted in SDT (Ackerman, 2020) that lead to the achievements of students. Social elements can thus increase or diminish motivation as a psychological factor. Autonomous motivation entails intrinsic and extrinsic actions, and the importance of self-controlled motivation includes external regulation and initial regulation (reward, punishment, desire for acceptance, avoiding guilt, self-esteem, and self-involvement conditionally). A-motivation addresses the lack of intention or motivation, which varies from other forms (Rahiem, 2021).

METHODOLOGY

This research is conducted in the business faculty and psychology department of a university in Cyprus, located in Kyrenia. Complying with ethical means of research conduct, no names or direct information is provided as per the agreement with the school and teachers. Teachers of the faculty have been systematically sampled (systematic sampling), which then according to their respective schedules were interviewed. As the current research uses several theories to address the topic at hand, the inductive approach has been deemed most appropriate. The qualitative approach was used for the collection of data and analyses (Creswell and Poth, 2017; Dor-Haim and Oplatka, 2021). This is due to the need for knowledge regarding the perspectives of the teachers on loneliness during the pandemic and how it affected the engagement and motivation of students. This approach is used to unravel the depth of the aforementioned effects in the specific context of this research (Denzin and Lincoln, 2018). It is important to note that a limitation is pinpointed as data are collected from a single faculty.

SAMPLING AND DATA COLLECTION

Several 20 faculty teachers were included in the data collection process through semi-structured interviews. The research used two criteria to select samples from the faculty (a) willingness to participate in the interview, (b) experienced loneliness during the emergency remote education, and (c) had over 100 students per semester. Information of participants is presented in **Table 1**. Semi-structured interviews were conducted through Zoom, complying with the rules and regulations during the COVID-19 pandemic. This approach ensures a systematic understanding of the case at hand through repeated questions from all the participants (Marshal and Rossman, 2016). Interviews were held by the first and second authors throughout the spring semester from March 2021 to June 2021. Participants were permitted to record the interviews for further transcription. Moreover, interviews were conducted anonymously, and obtained string data were deleted alongside recordings upon the completion of coding the process (keywords and their synonyms were coded through MAXQDA, v2020, VERBI Software, Berlin).

TABLE 1 | Participants' profile.

Factor	Count	Total
Age range	Min 30/Max 59	20
Experience	Min 2/Max 25	20
Gender	Female 13/Male 7	20
Number of students during pandemic classes (approx.)	Min 145/Max 220	+3,000

TABLE 2 | Factor % of repetition.

Factor/keyword	Categories	% Extracted
Loneliness (performance, stress, physical) teachers	- Lack of energy	75%
	- Interpersonal life	34%
	- Sadness	57%
	- Frustration	54%
	- Sleep/eat issues	13%
	- Autonomy	7%
	- Added focus on personal life	7%
	- Reduced performance	75%
	- Anxiety	44%
Engagement students	- Decreased attendance	66%
	- Reduced interaction	85%
	- Not answering questions	75%
	- Not engaging in solving problems	80%
	- Engagement lowered	65%
Motivation students	- Task completion reduce	75%
	- Resource usage increased	35%
	- Online practices and assignments done	40%
	- Online groups activities increased	55%
	- Dedication/achievements enhanced	35%
	- Performance reduced	65%

All authors are active in the field of psychology and education and took the responsibility for different aspects of the research. Furthermore, all authors combined their interpretations to reach conclusions. The third author evaluated the findings and noted varying aspects of the results. Interviews were conducted in three stages, namely, the initial stage (questions regarding loneliness at work during the pandemic), the second stage (perspective of the teachers on engagement and motivation of students), and the final stage (where participants provided any further remarks on the subject). The interviewer took social desirability into account and thus, no personal perception, judgment, opinions, and reactions were exhibited throughout the session. Collected data were then organized, categorized, and coded for patterns, tested, and interpreted (Marshal and Rossman, 2016). Themes were created based on codes to highlight keywords in the context of this research. Responses were compared and texts paraphrased to fit the current narrative (Strauss and Corbin, 1998).

RESULTS AND DISCUSSION

The analysis took several factors into account that are reported below. While demographic information is presented in **Table 1**, and **Table 2** exhibits the factor/keywords selected in the thematic analysis and their categories. The percentage extracted value shown in **Table 2** is based on the number of repetitions for each category.

Impact of Loneliness (Caused by the Pandemic)

Table 2 shows the importance or severity of each item from the perspective of participants. As keywords and synonyms for each item are coded, repetition increases the weighing. Hence, higher percentages are derived from keywords of an item being repeated significantly. It was found that teachers noted significant effects on their level of performance and emotions (particularly stress). This is while the physical health aspect was not highlighted in their response. Interestingly, two teachers noted positive impacts of loneliness as being able to focus more on their time. While the aforementioned were outliers, other teachers noted negative effects. It was also found that some teachers had issues of internet access, platform issues, and a lack of familiarity with online tools. Linked to SDT, this lowers the sense of competence and autonomy of teachers, which negatively impacts their emotions. Furthermore, through online platforms, teachers noted linkage with SCT as they did not have the means for observing others and interact with their colleagues through this newly applied change. Teachers felt a lack of energy for their preparation and working hours. Interpersonal relationships were also noted as an influential factor on teachers' level of felt loneliness and performance-related outcomes. Working in the environment of a home was not suitable for 35% of participants (**Table 2**). Frustration, sadness, and changes in sleep or eating were noted in five participants, which were related to the loneliness that was caused by the COVID-19 pandemic.

Teachers stated that loneliness negatively affected their professional performance. Some reported lowered confidence levels as they did not have proper communications with their work environment and their students. Their motivation for teaching was also negatively impacted by their perceived loneliness, which was further combined with stress, nervousness, and anxiety. Many teachers noted the negative effects of loneliness on their creativity in delivering course material. Frustration regarding lack of interaction, communication, classroom engagement, and work environment was repeatedly mentioned by participants, which are linked with the theoretical framework of this study. The impacts of loneliness on physical health were not found significant in responses (e.g., overeating, insomnia, etc.).

Engagement and Motivation of Students in Online Classes

It was significantly noted by all the participants that students had a vivid reduced engagement with the course throughout the pandemic. From large classes with over 50 students (**Table 1**),

attendance was lowered and engagement was reduced to <10 students per session (some classes of +60 students had engagement limited to 2–4 students per session). The motivation was lowered from the perspective of teachers. This can be linked to AGT from both competence and valence dimensions. Teachers felt that students did not show a rise in involvement toward their desired subjects or tasks. Their competence was further under question as uncertainty rose regarding success or failure in the abruptly shifted system. Furthermore, the performance of students was notably diminished as the overall mean of scores decreased by ∼15–20%. This is a reflection of lowered motivation according to the participants. Embedded in the premise of SCT, students had limited interactions, were forced to remain in their homes, and were experiencing sudden changes in their education and other aspects of life. Teachers noted that both engagement and motivation were decreased during the pandemic.

CONCLUSION

As the COVID-19 pandemic is still ongoing, it is imperative that both teachers and students are focused on ensuring that knowledge is properly transferred to the next generations. This requires preparedness, strategy, and fast responses to such events. Crucially, psychological factors should be the focus of decision-makers in this field so that educational psychology and psychosocial contexts are taken into consideration. Consequences that will rise from lack of motivation and engagement (both teachers and students) can have direct effects on the future of education. It is also important to note that the psychological state of teachers should be addressed and their well-being noted so that they can better overcome current challenges. In this sense, the motivation and engagement of students should be regarded as behavioral, personal, and important factors. Universities must imply technologies that allow teachers to hold classes effectively until the status quo has changed. This means usage of fast internet, proper tools and equipment, and training for mastering these elements. This research highlights the collaboration between school managers, IT teams, teachers, and faculty deans/vice deans. This can lead to enhanced outcomes in the performance of teachers and subsequently, students.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Girne American University Ethical Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AT: interview and writing. PF: supervision and interview. PZ: analysis and final writing. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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Effects of Online Problem-Solving Instruction and Identification Attitude Toward Instructional Strategies on Students' Creativity

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Problem-solving ability is an essential part of daily life. Thus, curiosity and a thirst for knowledge should be cultivated in students to help them develop problem solving and independent thinking skills. Along with positive attitudes and an active disposition, these abilities are needed to solve problems throughout the lifespan and develop -confidence. To achieve educational objectives in the context of globalization, creative ability is necessary for generating competitive advantages. Therefore, creative thinking, critical thinking, and problem-solving ability are important basic competencies needed for future world citizens. Creativity should also be integrated into subject teaching to cultivate students' lifelong learning and a creative attitude toward life. A questionnaire was distributed to 420 students in colleges and universities in Fujian, China. After removing invalid and incomplete responses, 363 copies were found to be valid yielding a response rate of 86%. Findings indicate that the new generation requires high levels of support to develop creativity and integrate diverse subjects such as nature, humanities, and technology. A rich imagination is needed to root creativity in the new generation.

Keywords: online problem, instructional strategies, identification attitude, affective component, creativity

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INTRODUCTION

Problem solving is ubiquitous in modern life and an essential skill for overcoming the problems we encounter daily. Problems can be overcome using problem-solving principles and creative inspiration from individuals (Hao et al., 2016). Thus, students' curiosity and thirst for knowledge should be cultivated to develop their problem solving and independent thinking abilities. An active approach and positive attitude to solving problems may enhance self-confidence and the ability to cope with challenges.

Education aims to cultivate healthy personalities, thinking, judgment, and creativity (Su et al., 2014). Essentially, education is the learning process to expand students' potential and cultivate their ability to adapt to—and improve—their environment. Basic goals of education should include self-expression, independent thinking, active inquiry, and problem solving. The curriculum goals should be life-centered to develop individuals' potential, cultivate scientific knowledge and skills, and help students adapt to the demands of modern life (Atmatzidou et al., 2018). Education aims to deliver basic knowledge, cultivate physical and mental development, inquiry, and reflection, and create healthy citizens through activities involving interaction between individuals, individuals and society, and society and nature.

To achieve educational objectives, students should be guided to develop their performance and creation abilities, research and active exploration abilities, independent thinking and problem-solving abilities. In the current globalization context, creative abilities are required for building competitive advantages. Accordingly, creative thinking, critical thinking, and problem-solving abilities are key skills for future world citizens. The cultivation of creativity should also be integrated into subject instruction, so that students develop their lifelong learning and creative attitudes toward life. Many countries are eager to cultivate creative new generations and promote the development of local business and humanistic technological education. It has become a national platform for the new generations of international technological art (Zhang and Chu, 2016). In particular, the traditional productivity-oriented competition model is slowly being transformed to creativity-oriented industries. Innovation capability is likely to bring competitive advantages in the Internet information age. As the field of information technology grows exponentially, innovation capability has become more important. However, if opportunities for development are missed, it can be difficult to catch up as the need for creativity is likely to grow in the foreseeable future.

In this study we focus on student creativity and how it is affected by online problem-solving instruction and identification of attitudes toward instructional strategies. Our purpose is to help the new generation develop creativity and a rich imagination to integrate the power of nature, humanities, and technology.

LITERATURE REVIEW AND HYPOTHESIS

Su et al. (2017) proposed that teachers who use effective instructional strategies allow students to successfully negotiate the challenges of life, as effective instructional strategies may enhance students' problem-solving ability. Deeper relationships between teachers and students also result in better learning motivation for students. Art-related activities were used to observe the factors affecting preschool children's problem-solving ability (Calvo et al., 2018). These factors included the cognition of problem goals, the development of perception ability, individual experience, interaction among peers, and resource assistance provided by teachers' instructional strategies. (LaForce et al., 2017) pointed out that identifying problem-related data is an essential step in the problem-solving process, i.e., the process of acquiring data, judging data, reducing data coverage, or linking relevant data (Wu et al., 2020a). Teachers' instructional strategies for online problem solving also affect student performance. The following hypothesis was therefore established for this study.

H1: Online problem-solving instruction has a significant positive correlation with identification attitude.

Lu et al. (2017) consider that teachers can enhance students' problem-solving ability and cultivate their problem-finding skills through instructional strategies guiding discussion of current affairs. Instructional strategies and the use of multimedia in technology education can induce students' identification attitudes and learning motivation, ultimately enhancing learning effectiveness and facilitating the development of imagination and creativity. Students with identification attitudes toward strategies could design problem-solving methods using science (Newhouse, 2017). The students understood that innovation was not necessarily the novel creation of "something from nothing" but might involve modification and new development based on existing affairs (Wu et al., 2020b). Achilleos et al. (2019) regard attitude toward education instructional strategies as the most important factor in students' creativity learning, where teachers, social and cultural factors, and experience in learning a foreign language revealed significant correlations. Our second hypothesis was therefore presented for this study.

H2: Identification attitude shows strong positive correlations with creativity.

Hsieh et al. (2017) posit that science-related thinking, discovery, and creation can be regarded as the research component of problem solving. Creativity is characterized by keenness, fluency, flexibility, originality, and elaboration—a kind of mental intelligence to generate distinct new concepts from known experiences or knowledge to solve problems with creative methods. Creativity can also be the application of known information, based on targeted outcomes, to generate novel, unique, and valuable new concepts or a new product or technology, unexplored innovative concepts or problem-solving abilities (Wu et al., 2021). Joachim et al. (2018) consider creativity as a part of problem solving, as problem-solving characteristics often involve novel thinking, strong motivation and determination to present the important status of the solution in the latent process of problem solving. However, Joachim et al.'s (2018) views on creativity and problem-solving have largely been unexplored to date. Novel performance at any level of the creative process could be considered as creation. Rietz et al. (2019) stated that life brings diverse problems and the key to addressing these lies in creativity. Only when people invest more attention in creativity can problems be solved leading to optimum solutions for life's challenges. This gives rise to our third hypothesis.

H3: Online problem-solving instruction reveals strong positive correlations with creativity

METHODOLOGY

Operational Definitions

Online Problem-Solving Instruction

Referring to Chen et al. (2019), the dimensions of online problem-solving instruction in this study were as follows.

1. Exercise example: Examples to illustrate teaching goals are provided as part of teachers' instruction. Students can learn effective problem-solving skills by observing experts' problem-solving interpretation and demonstration step-by-step.

2. Problem orientation: Problem-oriented learning refers to teachers giving carefully-designed situational problems to students, who start from a problem and proceed to problem solving and learning. After self-learning, students participate

in team discussion or discussions with teachers. With constant trials, solutions are eventually proposed.

Identification Attitude

The dimensions for identification attitude toward learning are based on Tang et al. (2019) and contain the following three components.

1. Cognitive component: This refers to an individual's belief in or knowledge of specific matters. The cognition of attitude refers to evaluation of meaning from factual statements presented, i.e., an individual may form an attitude for or against a particular object. For instance, students understand that teachers have rich professional knowledge and can present materials with good organization.

2. Affective component: The affective or emotional component refers to an individual's emotions and feelings, including positive and negative feelings of respect and contempt, like and dislike, sympathy and exclusion. For example, students evaluating a teacher as a friendly person would have positive feelings about the teacher and want to develop that relationship.

3. Behavioral component: Behavior refers to an individual's response tendency to attitude objects, i.e., an individual's explicit behavioral performance when acting in relation to objects. Possible responses include approach, avoidance, or indifference. For instance, students might accept their teachers' arrangement of an activity with respect and actively ask teachers questions.

Creativity

Kim et al. (2019) consider creativity includes basic cognitive abilities of divergent thinking, and that such abilities can be understood through testing tools or observation.

1. Fluency: Fluency refers to the quantity of a person's concept output, i.e., the ability to generate possible programs or solutions. A student with fluent thinking would propose several responses at the concept generation stage.

2. Flexibility: Flexibility is the ability to change thinking direction, i.e., being able to think of different methods when problems occur, to find out distinct applications or new concepts.

3. Originality: Originality refers to generation of unique and novel ideas, i.e., doing unexpected things or having the ability to see others' points of view.

4. Elaboration: Elaboration is a supplementary idea that refers to the ability to add new ideas to an original concept, i.e., the ability to increase novel concepts or build on existing ideas or basic concepts.

Research Objective

There are 89 colleges and universities in Fujian, China (50 colleges and 39 universities). Students in these institutions in Fujian comprised the research sample, and we distributed 420 copies of our questionnaire to them. After removing invalid and incomplete questionnaires, a total of 363 valid copies were returned, with a response rate of 86%.

Analysis

This research focused on discussing online problems about teaching and teaching strategies. It used experimental design and online problem solving to do experimental research for 2 hours every week for 24 weeks (48 hours in total). To analyze data from the questionnaire, Structural Equation Modeling (SEM) was used. We followed a two-stage analysis of goodness-of-fit and model verification. Confirmatory Factor Analysis (CFA) was first executed, aiming to test complex variables in the model by deleting measured variables with negative effects on the cause-and-effect analysis. We then proceeded with path analysis with the modified model. Path analysis aims to estimate the path relationship among variables. Without testing complex variables through CFA, the path analysis might be affected by complex variables resulting in poor goodness-of-fit or an insignificant model path. Amos 18.0 was used in this study for the model fit test. The measurement result of CMIN/DF is considered good if lower than five and excellent if lower than three; Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit index (AGFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI) are considered good if higher than 0.9; and Root Mean Square Residual (RMR), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) are good if values are lower than 0.05.

RESULTS

Factor Analysis

Two factors of "exercise example" (eigenvalue = 4.638, $\alpha = 0.88$) and "problem orientation" (eigenvalue = 3.751, $\alpha = 0.85$) were extracted from the scale of instructional strategies for online problem solving. The cumulative covariance accounted for was 72.683%. Three factors were extracted from the identification attitude scale: "cognitive component" (eigenvalue = 2.463, $\alpha = 0.81$), "affective component" (eigenvalue = 1.754, $\alpha = 0.83$), and "behavioral component" (eigenvalue = 1.491, $\alpha = 0.84$). The cumulative covariance reached 73.942%. Four factors were extracted from the creativity scale: "fluency" (eigenvalue = 2.461, $\alpha = 0.84$), "flexibility" (eigenvalue = 2.055, $\alpha = 0.82$), "originality" (eigenvalue = 1.976, $\alpha = 0.87$), and "elaboration" (eigenvalue = 1.689, $\alpha = 0.86$). The cumulative covariance accounted for was 79.317%.

Empirical Analysis of SEM

CFA results indicated the convergent and discriminant validity of the model were first observed, with convergent validity describing the reliability of individually observed variables, construct reliability (CR), and average variances extracted (AVE). Values of more than 0.5 indicate good reliability of individually observed variables. The factor loadings of the observed variables in the empirical analysis model were higher than the suggested value. CR should exceed 0.6, although some researchers suggest that 0.5 or above is acceptable. The model calibration results reveal CR was higher than 0.6, and AVE higher than 0.5, thus conforming to the suggested values.

Regarding the calibration results of structural equations, $\chi^{2/df}$, RMSEA, GFI, AGFI, RMR, and NFI were also calculated. For $\chi^{2/df}$ a standard $\leqq 5$ is suggested and $\chi^{2/df} = 2.422 \leqq 5$ in this study. The standard for RMSEA is $\leqq 0.08$; reported here

TABLE 1 | Structural equation modeling result.

Parameter/evaluation standard	Coefficient
Instructional strategies for online problem solving→ identification attitude	0.346***
Identification attitude→ creativity	0.375***
Instructional strategies for online problem solving→ creativity	0.425***
$\chi 2$/degree of freedom ≦5	2.422
Root mean square error of approximation (RMSEA) ≦0.08	0.044
Goodness-of-fit index (GFI) ≧0.9	0.951
Adjusted goodness-of-fit index (AGFI) ≧0.9	0.927
Root mean square residual (RMR) ≦0.05	0.023
Normed fit index (NFI) ≧0.9	0.937

***$p < 0.001$.

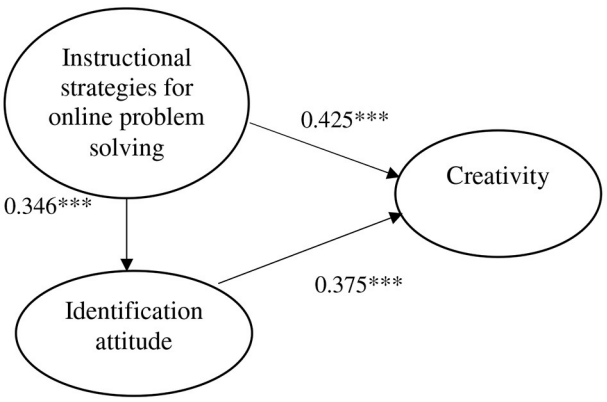

FIGURE 1 | FigureModel path diagram.

as 0.044 ≦ 0.08. GFI has a suggested standard of ≧0.9 and here it is reported as 0.951 ≧ 0.9. AGFI's suggested standard ≧0.9; it shows AGFI = 0.927 ≧ 0.9 in this study. RMR has a suggested standard of ≦0.05, and here it was reported as 0.023 ≦ 0.05. The NFI standard is ≧0.9; here it presents NFI = 0.937 ≧ 0.9 in this study. The overall model fit is good. The parameter calibration of the structural equation is shown in **Table 1** and **Figure 1**. The research results reveal instructional strategies for online problem solving→ identification attitude: 0.346***, that is, H1 was supported. Identification attitude→ creativity: 0.375***, that is, H2 was supported, and instructional strategies for online problem solving→ creativity: 0.425***, that is, H3 was supported.

DISCUSSION

The results show that online instructional strategies for online problem solving can enhance students' creativity. Apparently, an expository teaching style is no longer sufficient to cope with challenges encountered. Rather, teachers need to be willing to constantly learn and change their teaching behavior to cope with the rapid development of new technology and enhance teaching efficiency. When conveying new knowledge to beginners, the provision of exercise examples may help students establish new schema to benefit the application to similar situations. When lacking relevant schema, beginners may try to solve problems with trial and error. In this case, exercise examples with experts demonstrating problem-solving steps could benefit students' learning performance in the new field. Problems studied in real life may facilitate students' creativity, drawing on their existing knowledge as they use available resources and unconsciously apply existing knowledge to enhance creative ability. The solutions to problems are unpredictable but require the ability to cope with interaction between people in a given culture or society in different situations. As a result, teachers should make decisions with the consideration of situational changes in the teaching site, i.e., students' ability, performance and teaching schedule, rather than generalizing across all situations. We do not suggest limiting creative thinking or defining set times for enhancing students' creative thinking. Instead, factors that influence creative efficiency, creative value, and curriculum schedules should be taken into account. As teachers plan their teaching activities, they should pay particular attention to students' academic performance and the vicarious experience of teachers or peers. Uysal (2014) believed people can develop their mental ability through learning even without any creative invention. When we face any new concept, it is better to keep an open mind. That way we will realize there is still a lot to be created (Fernández et al., 2018). Labusch et al. (2019) said the development of creativity is not only creating positive thoughts but also turning these advantages into something more refined and broader. Teachers need to provide learning opportunities that students can apply in their daily lives leading to a re-evaluation of their identification attitudes toward instructional strategies. In this case, enhancing students' self-efficacy may assist them in overcoming learning challenges and cultivating a more positive learning attitude.

CONCLUSION

The research results demonstrate that online problem solving supports students to examine their ideas, chase after knowledge and continually improve their learning. They can freely develop their imaginations and make choices without being limited to find tools suitable for self-performance. They can concentrate on details, retain memories, and calmly think of more elaborate problem-solving approaches. Students draw on plans and organization to make significant progress in their thinking depth, novelty, flexibility, unique style, and diversity of function. To cultivate students' habits of brainstorming and thinking, they must become familiar with the general use of contextual information, and flexibility to change approaches and seek answers. Training flexible thinking is essential so that students can cope with problems with ease, propose various options and generate solutions. Lumsdaine and Lumsdaine (1995) let students learn from each other and modify their own thought. This transition could help them to achieve their potential. Solitary and monotonous learning material can no longer attract students' attention. Teachers need to provide a wider variety of materials and

free choices without limit. They could also find more suitable tools for teaching. Therefore, Treffinger and Isaksen (1992) no longer provide model answers. They want students to explore and develop without any restriction. This could also amplify their personal experience and bring more options into it. It enhances student's uniqueness, and this needs overall growth, subjectively and objectively. People should never venerate one over the other. We should also learn to make good use of the conditions and things we already have. The same thing could have an entirely different outcome depending on how we use it (Aşik and Erktin, 2019). Consequently, problem-solving instruction could assist in the cultivation of creativity in students' practice ability or cultivation of independent thinking and problem-solving ability. Teachers should attempt to create beneficial educational environments, cultivating students' learning interests, and enhancing their mental development. With accumulated experience, students can then be encouraged to develop more flexible skills, sensitive perception, and active thinking along with the ability to appropriately express these experiences. This would provide comprehensive preparation for enhancing students' creative thinking ability. Instructional strategies for online problem solving heavily emphasize cooperative discussion, brainstorming, and presentation. Tasks focusing on students' favorite novels and other relevant interests are valuable for sustaining long-term attention. Success in learning does not simply rely on rich knowledge and skillful techniques; affective attitudes also play an important part. Such characteristics may encourage students to positively and actively face problems and logically enhance their learning attitudes step-by-step.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethical Committee of the Huaqiao University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

Y-PW performed the initial analyses and approved the submitted version of the manuscript.

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The Effect of Using Technology Supported Material in Teaching English to First-Year Primary School Children: On Their Academic Success During COVID-19

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INTRODUCTION

Rapid technological developments have brought about the need for more innovative teaching techniques due to changes in applications and the tools used for this purpose. During the recent COVID-19 pandemic, schools and universities were closed and relationships among individuals were minimized (Gupta and Goplani, 2020). Karalis and Raikou (2020) outline that in this context learners experience negative feelings, stress, and anxiety. Sprang and Silman (2013) have pointed out that learners isolated in quarantine have a higher level of possible stress and adjustment disorder and suffer from worries. Many learners at home have experienced emotional and psychological problems during the COVID-19 closures and have failed to communicate actively or cannot be productive (Petrie, 2020). Online learning programs offer learners great opportunities to learn with more convenience AND ONLINE tutoring is one of the MOST prevalent educational tools used around the world during the pandemic (Kao and Chou, 2018).

During the pandemic, many changes in online learning have been observed. Today, technology in the form of computers, laptops, and electronic boards, etc., have replaced traditional teaching approaches using pens, notebooks, and the blackboard. Sen (2011) emphasized that reaching information has become much easier and technology plays a great role in effective and fast outcomes. Karakaya (2013) pointed to the need for teachers to carry out teaching *via* technology and strict controls, otherwise, the young generation will not benefit from rapid developments in technology.

In their studies on the widespread use of and easy access to technology, Günüç et al. (2013) and Ahmadi and Reza (2018) outline that as learners develop skills in the use of technology, they will have to adapt to new responsibilities and this will significantly affect their behaviors.

One of the most effective ways of using technology productively in teaching is to provide material, particularly technological material, which has a significant place in teaching. Sen and Sentürk (2014) stress that use of technology and computers have become a must without resorting to any traditional methods.

Besides providing controlled learning with clear aims for the learners, technology in education helps teachers overcome possible problems and provide a learning environment with suitable, well-designed, and well-prepared materials (Demirel and Yagci, 2012).

Language is the most effective way of communication in an individual's reflecting feelings, thoughts, and wishes.

Concretizing abstract concepts in language teaching is crucial for learners (Karadayı-Taşkıran et al., 2015), as it means they have understood complex ideas. Therefore, supporting tools are necessary for teaching concepts. Studies by both Sirakaya (2015) and Taşkiran et al. (2015) argue that researched reality helps learners become more active participants in learning compared to ordinary lesson materials.

Technological material helps teachers take over tasks and adds to teaching directly. The material in foreign language teaching does not only support learning but also increases interest and helps permanent learning. Proper use of material lessens problems such as unwillingness to learn and indifference to the subject. The internet functions as a virtual library and hence makes authentic language material available to language learners across the globe (Imtiaz et al., 2021).

Kaya (2006) stresses that the material chosen should respond to learners' needs and that learners should be encouraged to design material. DePew similarly (DePew, 2015) has propounded that learners demonstrate a positive attitude toward accessing online language learning material. Therefore, it can be claimed that technological material motivates learners, keeps them alert in class for longer, facilitates achieving targets specified in teaching programs, and helps to sustain permanent learning (Mert and Sen, 2019).

PROBLEM STATEMENT

Changes in technology affect education to a great extent. In our world today, English has become an essential language, which can easily be taught through the rapid developments in technology in an enjoyable way. Using suitable material and tools while teaching affects learning. Teachers working with primary first-years should closely follow developments in technology and share material and tools with learners to increase quality. Taking up the idea that the teacher should consider learners' needs, their learning time, and provide a suitable teaching environment, this study examined the effect of using technology and material in teaching English to primary first-year learners.

AIMS OF THE STUDY

This study aimed to specify the effect of technology-supported material in teaching English to primary first-year learners and their academic success. In fall 2020–21 attendance was on rotation bases in the TRNC (Turkish Republic of North Cyprus). Students would receive face-to-face lessons on 1 day and online on the other. This study aimed to specify any significant difference between these two approaches as well as any permanent learning.

METHODOLOGY

Research Method

To get an answer to the subject question, an experimental uncensured pre/post-test, one of the quantitative research methods, was conducted to the test-controlled group. Experimental researchers are composed of studies to determine the effect of differences specified by the researcher on dependent variables (Büyüköztürk et al., 2016).

Participants and Sampling

The participants were randomly selected primary first-year learners from two primary schools in Lefkoşa in the fall 2020–2021 academic year.

Data Collection

The primary first-year children were given a pre-test before presenting the topic to elicit information about the "My Family" unit, conducted in 5 h throughout the week for consolidation. While the control group had face-to-face lessons through traditional methods, teaching techniques and the material was used with the experimental group.

A post-test was conducted to determine the effectiveness of the methods. To specify the effect of the methods on permanent learning, a "permanency test" was conducted 6 weeks after the post-test without informing the learners. As an experimental model, control and experimental groups were formed. Their prior knowledge was specified through pre/post-tests. Traditional teaching methods were tried with the control groups. The same process was conducted with experimental groups using technology and material. To determine the effect of the methods on academic success, the learners were given a post-test. After 6 months, without informing the learners, they were given a permanent test to determine permanent knowledge through the applied methods.

Data Analysis

A dependent sampling *t*-test was given to the primary first-year learners and the control group to determine any significant difference between their pre/post, and permanent scores.

To specify any difference in the progress test scores of both groups, a dependent sampling *t*-test with two choices, and the ANOVA test with more than two choices were conducted.

Findings

As seen in **Table 1**, 4 learners (20.0%) in the experimental group had a very low, 8 (40.0%) low, 8 (40.0%) average, 1 (5.0) learner in the control group had very low, 10 (50.0%) low, 7 (35.0%) average, and 2 (10.0%) low scores.The findings from the pre-test of the experimental group in terms of gender, 1 (9.0%) girl had very low, 6 (54.6%) girls had low, and 4 (36.4) female students had average scores. None of the female learners had a very good score. In total, 3 (33.3) male students had very low, 2 (22.3) had low, and 4 (44.4) average scores. The post-test scores by the control group concerning any of the devices do not indicate a different effect. The permanent-test results by the control group concerning owing any of the devices do not indicate a different effect. Overall, 1 (10.0%) of the girls in the pre-test control group had very low, 4 (40.0%) low, and 5 (50.0%) average scores. Then, 6 (60.0) of the boys in the pre-test control group had low, 2 (20.0%) average and 2 (10.0) had good scores. At this point, it is clear that in terms of pre-test success scales, the control group showed a higher performance than the experimental group. In terms

TABLE 1 | The pre-test success scales, the post- test success scales and permanent test success scales of primary school 1st grade experimental and control group students.

Test	Groups	Scales	Total		Gender			
					Girls		Boys	
			N	%	*N*	%	*N*	%
Pre-test	Experimental group	Very Low	4	20.0%	1	9.0%	3	33.3%
		Low	8	40.0%	6	54.6%	2	22.3%
		Average	8	40.0%	4	36.4%	4	44.4%
		Good	0	0.0%	0	0.0%	0	0.0%
		Very Good	0	0.0%	0	0.0%	0	0.0%
	Control group	Very Low	1	5.0%	1	10.0%	0	0.0%
		Low	10	50.0%	4	40.0%	6	60.0%
		Average	7	35.0%	5	50.0%	2	20.0%
		Good	2	10.0%	0	0%	2	20.0%
		Very Good	0	0.0%	0	0.0%	0	0.0%
Post-test	Experimental group	Very Low	0	0.0%	0	0.0%	0	0.0%
		Low	0	0.0%	0	0.0%	0	0.0%
		Average	0	0.0%	0	0.0%	0	0.0%
		Good	6	30.0%	5	45.5%	1	11.1%
		Very Good	14	70.0%	6	54.5%	8	88.9%
	Control group	Very Low	0	0.0%	0	0.0%	0	0.0%
		Low	1	5.0%	1	10.0%	1	0.0%
		Average	7	35.0%	3	30.0%	4	40.0%
		Good	7	35.0%	3	30.0%	4	40.0%
		Very Good	5	25.0%	3	30.0%	2	20.0%
Permanent test	Experimental group	Very Low	0	0.0%	0	0.0%	0	0.0%
		Low	0	0.0%	0	0.0%	0	0.0%
		Average	1	5.0%	1	9.1%	0	0%
		Good	7	35.0%	4	36.4%	3	33.3%
		Very Good	12	60.0%	6	54.5%	6	66.7%
	Control group	Very Low	0	0.0%	0	0.0%	0	0.0%
		Low	4	20.0%	2	20.0%	2	20.0%
		Average	7	35.0%	3	30.0%	4	40.0%
		Good	6	30.0%	4	40.0%	2	20.0%
		Very Good	3	15.0%	1	10.0%	2	20.0%

of gender, in both groups, girls exhibited a lower performance than boys.

In total, 6 (30.0%) learners of the experimental group had good, and 14 (70.0%) had the highest scores in the post-test. Moreover, 1 (5.0%) of the control group had low, 7 (35.0%) average, 7 (35.0%) good, and 5 (25.0%) had the highest results. In the same test, 5 (45.5) girls scored good and 6 (54.5%) the highest. One (11.1%) of the boys had good, and 8 (88.9%) had the highest scores. The result of the analysis indicates that 1 (10.0%) girl had low, 3 (30.0%) average, 3 (30.0%) good, and 3 (30.0%) the highest scores. Overall, 4 (40.0%) of the boys had average, 4 (40.0%) good, and 2 (20.0%) had the highest scores. The overviewed of these performance scales indicates that the control group had a lower

TABLE 2 | The pre/permanent-test and the post/permanent-test results by both the experimental and control groups.

Groups	Test	*N*	$\overline{X}$	Ss	sd	*t*	*p*
Experimental	Pre-test	20	42,500	14,001	19	−13,379	0.000
	Permanent-test	20	84,250	8,626			
Control	Pre-test	20	46,000	14,104	19	−3,264	0.004
	Permanent-test	20	62,500	16,741			
Experimental	Post-test	20	88,000	8,335	19	1,370	0.186
	Permanent-test	20	84,250	8,626			
Control	Post-test	20	70,750	12,383	19	1,849	0.080
	Permanent-test	20	62,500	16,741			

performance than the experimental group. In terms of gender, it was observed that boys had higher scores compared to girls.

The experimental group permanent-test results, as shown in **Table 1**, are 1 (5.0%) average, 7 (35.0%), and 12 (60%) highest. As for the control group, 4 (20%) had low, 7 (35%) average, 6 (30.0%) good, and 3 (15.0%) highest scores. The analysis result of the permanent-test reveals that 1 (9.1%) girl participant had average, 4 (36.4%) good, and 6 (54.5%) highest scores. In total, 3 (33.3%) of the boys had good, and 6 (66.7%) the highest scores. The result of the analysis showed that 2 (20.0%) of the girls had low, 3 (30.0%) average, 4 (40.0%) good, and 1 (10%) the highest score. Moreover, 2 (20%) of the boys had low, 4 (40%) average, 2 (20.0%) good, and 2 (20%) the highest scores. These performance scale overviews show that the control group had lower scores compared to the experimental group. In terms of gender, in the experimental group boys had higher, but in the control group girls had higher scores.

As shown in **Table 2**, there is a significant difference ($p < 0.01$) between the averages of the Pre/Permanent-test scores. Moreover, a significant difference between the post-test scores can be observed in the Table ($p < 0.01$). In the post/Permanent-test results a significant difference was observed ($p < 0.01$) in the Post-Permanent-test results.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are publicly available. This data can be found here: https://osf.io/wk467/.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Near East University Ethical Committee. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

FK wrote the initial abstract, manuscript, and table drafts.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.756295/full#supplementary-material

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BRIEF RESEARCH REPORT
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Attitudes of Postgraduate Students Towards Distance Education During the COVID-19 Pandemic: North Cyprus Example

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The distance education model has become the most common educational model used around the world due to the COVID-19 pandemic that emerged in China at the end of 2019. In North Cyprus (NC), traditional face-to-face education had been resumed through online channels. The rapid shift to online channels has not only caused distress among students who do not have experience with using in online education systems, but also caused many problems to surface in terms of access to education. This study aims to explore the attitudes and views of higher education students in NC regarding the distance education implemented during the COVID-19 pandemic in the 2020–2021 educational year. In this quantitative study, the survey method was used. A random sampling approach was used for determining the study group, which was formed of 470 volunteer higher education students. According to the analysis of the data collected from the students, it was determined that they received an average score of $\bar{x} = 82.52 \pm 19.50$ points from the overall Attitudes Regarding the Use of Distance Education Environments During the Pandemic (ASRUDEEDP) scale, $\bar{x} = 23.03 \pm 7.21$ from the competence and education sub-dimension, $\bar{x} = 26.36 \pm 5.81$ from the practicality sub-dimension, $\bar{x} = 18.20 \pm 4.83$ points from the efficiency sub-dimension, and $\bar{x} = 14.93 \pm 4.12$ from the satisfaction sub-dimension. It was identified that there were no differences in the scores according to the age group, grade, or Internet use durations ($p > 0.05$) but the scores of male students were observed to be higher than those of female in the sub-dimensions of competence and motivation as well as practicality within the ASRUDEEDP.

Keywords: COVID-19, education during the pandemic, online education, higher education, postgraduate studies

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INTRODUCTION

COVID-19 disease is caused by the novel coronavirus (SARS-CoV-2) that emerged in Wuhan, China, at the end of December 2019. Carrying high risks of infection, the virus has spread across the whole world, primarily to Europe [World Health Organization (WHO), 2020]. During this process, recommendations to close educational institutions to minimize the high risk of spread among the communities were taken into consideration (Kawano and Kakehashi, 2015; De Luca et al., 2018). Within this context, the decision was made to temporarily shut down

schools, universities, and other educational institutions in many countries to slow down the rate at which the COVID-19 pandemic was spreading. After the Health Ministry announced the first incidence of COVID-19 in the TRNC on March 11, 2020, the schools and educational institutions were temporarily closed on March 25 (TRNC Health Ministry, 2020).

For the management of this process and the crisis, the Higher Education Institution (YÖK) swiftly made the decision to transform the conventional education to distance education for the upcoming spring semester of the 2020 education year. As a result of this announcement, all levels of conventional education were halted; thus, distance education began to be implemented along with cancelation of local and central examinations, which were later replaced by web-based examinations for the assessment of the level of student efficiency. Within this context, the system that had been constructed based on conventional education had to be transformed into web-based distance education as a result of successful crisis management.

The developments of our era, particularly in the areas of technology and science, enhance the tendency for adaptation to the era and the desire for education. However, educational systems have resisted the need to adapt to the innovations in the areas of technology and science and have therefore been criticized for not being sufficiently innovative (Akdemir et al., 2020). Being a society that produces and evolves in the information era in which we are living is only possible by becoming an information society. Being an information society, on the other hand, is only possible with individuals who continuously reach and develop through information. This development within individuals is possible through lifelong education. However, it is not possible for full-time working adults to access education opportunities that could facilitate their personal development in a conventional education model.

Distance education is a discipline aimed at eliminating the limitations of the sources for teachers, students, and education while using current technologies (Bozkurt, 2017). In general, distance education can be defined as a dedicated, complex, hierarchic, and unilinear education system.

When the definitions of distance education are taken into consideration, the California Distance Learning Project (CDLP) defines the distance education programs as system that actualize education by making connections between the student and educational resources, whereas the United States Distance Learning Association (USDLA) defines it as "Fetching the education to students in different regions through satellite, videos, graphics, computers and multimedia-assisted electronical equipment" (Dinçer, 2017).

Distance Education is an education technology system implemented when the teacher and the student are not in the same place. According to a broader definition, it is an education type that provides connections through electronic communication media or printed materials when teachers and students are in different places (Aslantaş, 2011).

When the common features of the definitions are taken into consideration, it can be seen that distance education is a system that eliminates the notions of place and time between the teacher and student while benefiting from the advantages of technology through an effective way of accessing the information sources and facilitating to students. When the historical instances of the distance education are taken into consideration, it is found that applications date back to the 1700s. It is known that the first implementation of education through letters took place in Sweden in 1728. Also, according to information printed in a newspaper announcement in Sweden in 1833, education was planned to be delivered through letters (Çoban, 2012).

Today, associate degree, graduate, and postgraduate programs in many education facilities are conducted through distance education. Along with this, many universities apply a mixed education model through the use of both face-to-face and distance education methods. For many years, distance education applications have been carried out as "open education," especially in the Anadolu University Open Plan Faculty. According to the Rules and Principles of Distance Education in Postgraduate Institutions published by YÖK, distance education applications have become more popular in universities (Cabı and Ersoy, 2017).

MATERIALS AND METHODS

Model of the Research

Survey method is used in this quantitative study. This research is a supplementary study including scanning through survey method. According to Karasar (2015), survey models are research approaches which aim to depict a situation that once existed or currently exists as it is. The event, individual, or object which is the subject of the study is aimed to be depicted as it is under its very circumstances.

Population and Sample

The population of this study was defined as postgraduate students in the Lefkoşa, Gazimağusa, Girne, and Lefke districts of North Cyprus. Convenience sample, as one of the sample types of quantitative research, is taken as a basis; thus, 470 students are reached in total.

In this study, 13.83% of the participant students were aged between 18 and 19, while 41.70% were between 20 and 21, 31.91% were between 22 and 23, and 12.55% were 24 or older; hence, the average age was 21.62 ± 2.67, where 64.47% were female. It was determined that 25.96% of the students were in first grade, 22.77% were in second grade, 30.21% were in third grade, and 21.06% were in fourth grade. Additionally, 20.43% of the students stated that they used the Internet daily for 4 h, whereas 26.60% use the Internet for 5 to 6 h, 21.06% for 7 to 8 h, and 31.91% for 8 h or more.

Data Collecting Tool

The attitudes regarding the use of distance education environments during the pandemic scale were used as the data collection tool. This scale was developed by Yıldız et al. (2021). It is composed of a total of 24 items and is a five-point Likert-type scale. The scale has a five-point structure type, namely, I strongly agree = 5, I agree = 4, I am neutral = 3,

I disagree = 2, and I strongly disagree = 1. Exploratory factor analysis (EFA) was conducted in order to determine the distribution of the scale items on the study group. According to the results of the EFA, the number of items in the scale was reduced from 25 to 24, with the eigenvalue greater than 1, considering that it disrupted its four-factor structure. The four-factor structure of the scale, consisting of 24 items with an eigenvalue greater than 1, indicates 73.42% of the total variance. A variance rate greater than 30% is considered sufficient for test developing studies in behavioral sciences (Rennie, 2012; Büyüköztürk, 2018). The results obtained from the validity and reliability analyses demonstrate that the scale has a consistent structure within itself.

Analysis of the Data

Statistical Package for Social Sciences (SPSS) 24.0 software was used in the statistical analysis of the research data. Cronbach's alpha test, which is an internal consistency test, was applied within the scope of reliability study for the answers given by the participant students to ASRUDEEDP, and the alpha coefficient for the overall scale was determined as 0.941.

The socio-demographical distribution of the students was determined through frequency analysis, and descriptive statistics were given regarding the scores that the participant students obtained from the ASRUDEEDP.

In order to compare the scores of the students in ASRUDEEDP according to their socio-demographical features, the compliance of the scale scores with the normal distribution was firstly examined through the Kolmogorov–Smirnov test, Q-Q plot graph, and skewness-kurtosis values, and it was determined that they conformed to normal distribution. Therefore, parametric hypothesis tests were used in the study; for example, the independent sample *t* test was used when the independent variable consisted of two categories, and ANOVA was used when it consisted of three categories or more.

Findings

The descriptive statistics of the socio-demographical features of the participant students are listed below as well as the effects of their ages, sexes, grades, and Internet use durations on ASRUDEEDP and *t* test and ANOVA results that would highlight the differences among them, if they exist.

The descriptive statistics of the scores of the students from ASRUDEEDP and the ANOVA results based on a comparison of the ASRUDEEDP scores according to their age groups are shown in **Table 1**.

Considering the results shown in **Table 1** in the total points, it is determined that students received an average score of $\bar{x} = 82.52 \pm 19.50$ from the overall ASRUDEEDP, $\bar{x} = 23.03 \pm 7.21$ from the competence and motivation sub-dimension, $\bar{x} = 26.36 \pm 5.81$ points from the practicality sub-dimension, $\bar{x} = 18.20 \pm 4.83$ from the efficiency sub-dimension, and $\bar{x} = 14.93 \pm 4.12$ points from the satisfaction sub-dimension.

When **Table 1** is evaluated, it is determined that there is no statistically significant difference between the overall ASRUDEEDP scores of the students and in the sub-dimensions of competence and motivations, practicality, efficiency, and satisfaction in the scale according to age group.

TABLE 1 | Comparison of the students' scores from ASRUDEEDP according to their age group.

	Age group	*N*	$\bar{x}$	*S*	Min	Max	*F*	*p*
Competence and Motivation	18–19 years	65	21.52	6.96	7	35	2.401	0.067
	20–21 years	196	22.62	7.04	7	35		
	22–23 years	150	23.62	7.15	7	35		
	24 years and older	59	24.56	7.94	7	35		
	Total	470	23.03	7.81	7	35		
Practicality	18–19 years	65	26.45	6.20	8	39	1.514	0.210
	20–21 years	196	25.76	5.62	8	40		
	22–23 years	150	26.70	5.87	8	40		
	24 years and older	59	27.41	5.78	14	40		
	Total	470	26.36	5.81	8	40		
Efficiency	18–19 years	65	17.38	4.93	5	25	0.903	0.439
	20–21 years	196	18.14	4.76	5	25		
	22–23 years	150	18.49	4.68	5	25		
	24 years and older	59	18.53	5.27	5	25		
	Total	470	18.20	4.83	5	25		
Satisfaction	18–19 years	65	14.65	4.46	4	20	0.336	0.799
	20–21 years	196	14.86	3.92	4	20		
	22–23 years	150	14.98	4.13	4	20		
	24 years and older	59	15.36	4.43	4	20		
	Total	470	14.93	4.12	4	20		
ASRUDEEDP	18–19 years	65	80.00	20.11	24	112	1.376	0.249
	20–21 years	196	81.38	18.94	26	120		
	22–23 years	150	83.79	19.30	24	120		
	24 years and older	59	85.85	20.94	31	120		
	Total	470	82.52	19.50	24	120		

Table 2 shows the independent sample *t* test results for the comparison of the overall ASRUDEEDP score according to gender.

According to the results in **Table 2**, it is determined that there is statistically significant difference between the scores of the students in the competence and motivation sub-dimension and the practicality sub-dimension ($p < 0.05$). Male students scores were higher than female students' scores in the sub-dimension of competence and motivation throughout the ASRUDEEDP. There is also no significant difference between the overall ASRUDEEDP scores of the students and the sub-dimensions of the efficiency and satisfaction according to their gender ($p > 0.05$).

Table 3 shows the ANOVA results of the comparison between the overall ASRUDEEDP scores of the students according to their grades.

When **Table 3** is evaluated, it is determined that there is no significant difference between the overall ASRUDEEDP scores of the students according and the sub-dimensions of the scale according to their grades ($p > 0.05$).

Table 4 indicates the ANOVA results of the comparison of the overall ASRUDEEDP scores of the students regarding their daily Internet use durations.

When **Table 4** is evaluated, it is indicated that there is no statistically significant difference between the overall ASRUDEEDP scores of the students and the sub-dimensions of competence and motivation, practicality, efficiency, and satisfaction points in the scale ($p > 0.05$).

CONCLUSION AND DISCUSSION

The rapid development of the technology, communication and transportation has accelerated globalization. In particular, the effects of the rapid spread of Internet technologies and communication are immense. Information is spread very quickly and shared through these channels. Naturally, these developments evolve according to the needs of all members of societies according to their age groups and information technologies impact all aspects of life. Due to the COVID-19 pandemic, the world has experienced

TABLE 2 | Comparison of the students' scores from ASRUDEEDP according to their gender.

	Gender	*N*	$\bar{x}$	*s*	*t*	*p*
Competence and motivation	Female	303	22.54	6.99	−1.984	0.048*
	Male	167	23.92	7.54		
Practicality	Female	303	25.85	5.45	−2.595	0.010*
	Male	167	27.29	6.33		
Efficiency	Female	303	18.17	4.83	−0.186	0.853
	Male	167	18.25	4.83		
Satisfaction	Female	303	15.08	4.11	1.067	0.286
	Male	167	14.66	4.14		
ASRUDEEDP	Female	303	81.64	18.88	−1.322	0.187
	Male	167	84.12	20.53		

*$p < 0.05$.

TABLE 3 | Comparison of the students' scores from ASRUDEEDP according to their grades.

	Grade	*n*	$\bar{x}$	*S*	Min	Max	*F*	*p*
Competence and Motivation	First grade	122	22.11	6.80	7	35	1.021	0.383
	Second grade	107	23.63	7.61	9	35		
	Third grade	142	23.39	7.03	7	35		
	Fourth grade	99	22.99	7.51	7	35		
Practicality	First grade	122	26.39	5.55	8	40	0.964	0.409
	Second grade	107	25.76	5.41	8	40		
	Third grade	142	26.26	6.33	8	40		
	Fourth grade	99	27.12	5.78	8	40		
Efficiency	First grade	122	17.77	4.65	5	25	0.838	0.473
	Second grade	107	18.54	4.86	5	25		
	Third grade	142	18.51	4.73	5	25		
	Fourth grade	99	17.89	5.14	5	25		
Satisfaction	First grade	122	14.91	4.10	4	20	0.658	0.578
	Second grade	107	15.38	4.07	4	20		
	Third grade	142	14.84	4.07	4	20		
	Fourth grade	99	14.61	4.29	4	20		
ASRUDEEDP	First grade	122	81.19	18.62	24	120	0.277	0.842
	Second grade	107	83.31	19.09	26	120		
	Third grade	142	83.01	19.92	25	120		
	Fourth grade	99	82.61	20.57	24	120		

TABLE 4 | Comparison of the students' scores from ASRUDEEDP according to their daily Internet use durations.

	Daily Internet use duration	*N*	$\bar{x}$	*s*	Min	Max	*F*	*p*
Competence and Motivation	4 h or less	96	22.90	7.55	7	35	0.319	0.812
	5–6 h	125	22.95	7.06	7	35		
	7–8 h	99	23.65	6.68	7	35		
	8 h and more	150	22.77	7.49	7	35		
Practicality	4 h and less	96	25.30	5.64	8	38	1.488	0.217
	5–6 h	125	26.38	5.23	8	40		
	7–8 h	99	26.90	5.66	8	40		
	8 h and more	150	26.67	6.42	8	40		
Efficiency	4 h or less	96	17.93	5.07	5	25	0.159	0.924
	5–6 h	125	18.15	5.06	5	25		
	7–8 h	99	18.34	3.90	5	25		
	8 h and more	150	18.31	5.05	5	25		
Satisfaction	4 h or less	96	15.39	4.09	4	20	0.609	0.609
	5–6 h	125	14.69	4.05	4	20		
	7–8 h	99	15.02	3.71	4	20		
	8 h and more	150	14.79	4.46	4	20		
ASRUDEEDP	4 h or less	96	81.51	19.79	24	116	0.265	0.851
	5–6 h	125	82.18	18.66	27	120		
	7–8 h	99	83.91	17.76	24	120		
	8 h and more	150	82.53	21.16	24	120		

a period in which it has been forced to adapt to new circumstances; therefore, the educational systems are being re-configured and online education is being integrated with face-to-face education. Online classes include providing the students with the leaning materials they needed which includes video tutorials, PowerPoint presentations, handouts etc. (Cortez, 2020). According to Doğan et al. (2017), the increase in the use of technology and the development of communication technologies facilitate the Internet access from all over the world along. From December 2019, parts of the world entered lockdown as a result of the COVID-19 pandemic, and the rapid spread of online education made immense contributions to the field of education (Talidong and Toquero, 2021). These new circumstances have increased the amount of time that students spend using the Internet. Considering the quantitative findings of the research, it is indicated that 80% of the university students use the Internet for 5 h or more, 53% use the Internet for 7 h or more, and 32% for 8 h or more.

Even though the universities were largely unprepared to provide distance education during the COVID-19 pandemic, 49% of the students considered online education to be practical and sufficient, while 18% considered it to be effective and 15% were satisfied with this type of education. On the one hand, this demonstrates that particularly within the context of course explanation, distance education serves its purposes; however, in the researcher's opinion, the lack of experience of teachers and students in this area might have decreased the efficiency in terms of pedagogical efficiency, and thus, the satisfaction rates of the students might have decreased either due to this or because of the lack of an environment that facilitates socialization. However, the general score totals obtained from the data indicate that the attitudes toward the use of distance education are high.

It was found that students' attitudes toward the use of distance education environments in the pandemic generally increase with age; however, there is no statistically significant difference according to age groups. Considered separately in terms of competence and motivation, usefulness, efficiency, and satisfaction or as a whole, it is indicated that there is no statistically significant difference between age groups even though all university students' attitudes toward educational mediums are higher when compared to competence and motivation, usefulness, efficiency, and satisfaction. When evaluated within the scope of daily Internet use durations, there is statistically significant difference among the attitudes. Similar to the age groups, no statistically significant difference is seen between the grades. This indicates that there is a parallelism between age and grades, which demonstrates consistency of the results and the credibility of the scale from another point of view.

Regarding the use of the distance education environments during the pandemic, in the practicality and competence and motivation sub-dimensions, the attitudes of the male students are statistically higher than the female students, and as this difference is statistically significant, this indicates that male students consider online education to be more practical and sufficient when compared to females and the reasons for that should be researched further. In the efficiency and satisfaction sub-dimensions, no statistically significant difference was found between the male and female students' attitudes.

RECOMMENDATIONS

The following recommendations can be listed according to the results of this study: Given that the effects of the COVID-19 pandemic will last for some time and the distance education will be implemented alongside face-to-face education, not only the educational programs but also the educational methods and techniques should be enhanced and enriched in the light of technological developments. In this context, proficiency techniques for evaluation should be reconsidered. Redesigning the pedagogical

approaches and teaching programs taking online education into consideration along with the face-to-face education would beneficial in teacher trainings. In training new teachers in these new programs, on-the-job trainings should be provided, not only in postgraduate studies but also in lower education levels.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Near East University Ethical Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

YA wrote the manuscript and designed and completed the research report.

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BRIEF RESEARCH REPORT
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Discussion of Teaching With Multiple Intelligences to Corporate Employees' Learning Achievement and Learning Motivation

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The development of multiple intelligences used to focus on kindergartens and elementary schools as educational experts and officials considered that the development of students' multiple intelligences should be cultivated from childhood and slowly promoted to other levels. Nevertheless, the framework of multiple intelligences should not be simply promoted in kindergartens and elementary schools, but was also suitable in high schools, universities, and even graduate schools or in-service training. Taking employees in Southern Taiwan Science Park as the research subjects, total 314 employees in high-tech industry are preceded the 16-week (3 h per week for total 48 h) experimental teaching research. The research results show that (1) teaching with multiple intelligences would affect learning motivation, (2) teaching with multiple intelligences would affect learning achievement, and (3) learning motivation reveals remarkably positive effects on learning achievement. According to the results to proposed discussions, it is expected to help high-tech industry, when developing human resource potential, effectively well-utilize people's gifted uniqueness

Keywords: multiple intelligences, learning achievement, learning motivation, content-based curriculum, situated learning

INTRODUCTION

Domestic education system, for a long time, paid attention to intellectual education. In the reflection before education reform, it was discovered that over-emphasizing intellectual education resulted in many students being sacrificed under the education system. Under the education reform in past years, the situation is gradually improved. Everyone possesses distinct intelligences and various combination and application methods that multi-methods should be used for the evaluation. Such methods provide special children with the growth model to develop the potential.

Teachers' teaching with multiple intelligences allows such students fully developing the potential.Multiple intelligences particularly emphasize the application of intelligence in real life situations that the integration of teaching with multiple intelligences could help teachers assist in students' learning with multiple instruction and students expand abilities beyond subjects emphasized in traditional education. It would help current teaching styles.

Everyone presents the unique operation method that, with proper encouragement and guidance, the intelligence could achieve certain standards. For this reason, multiple intelligences allow each student finding out the sky and reaching the goal of adaptive development. The emergence of knowledge-based economy in past years reveals the importance of human capital of a nation. In face of increasing employment population domestically, understanding the ability for the right job in the right place is an extremely important issue for individuals or enterprises. The development of multiple intelligences used to focus on kindergartens and elementary schools as educational experts and officials considered that the development of students' multiple intelligences should be cultivated from childhood and slowly promoted to other levels. For high and elementary school students, multiple intelligences could help teachers better understand students from the intelligence distribution of students. For instance, multiple intelligences could be utilized for digging out gifted students and further providing them with suitable development opportunities to make the growth. Besides, multiple intelligences could be used for supporting students with problems and adopting more suitable methods for their learning. Regarding research on multiple intelligences, Ronald et al. (2001) covered the research objects of kindergarten pupils, higher graders of elementary schools, and high school students as well as the research fields of foreign language vocabulary memory, motivation to learn, mathematical problem solving, and reading comprehension of English and mathematics. Such research findings showed that multiple intelligences applied teaching activities could significantly enhance students' learning achievement, promote the motivation to learn, enhance reading the comprehension, and even enhance the ability of cooperative learning with peers. Broadly speaking, the framework of multiple intelligences cannot be promoted simply in kindergartens and elementary schools, but are suitable for high schools, universities, and even graduate schools or in-service training. A lot of international MBA courses are added creative thinking to strengthen the development of adaptability and creativity in the new era. For this reason, teaching with multiple intelligences to corporate employees' learning achievement and learning motivation is discussed in this study, expecting to help high-tech industry effectively well-utilize people's gifted uniqueness in the challenge of developing human resource potential.

LITERATURE REVIEW

Simoncini et al. (2018) stated that teaching with multiple intelligences stressed on the provision of democratic, respectful, and multiple learning environment for each student being able to present the ability, self-affirm personal performance, and further induce strong learning interests to surpass the originally dominant intelligence field in learning outcome. Inan and Erkus (2017) indicated that using multiple intelligences for curriculum design could provide various intellectual learning activities and create the environment with which students were comfortable. Learning was the preparation for challenge; learners would develop by accepting challenges exceeding the current abilities. Encouraging students deeply and meaningfully to engage in the learned topics was the solid and durable learning basis for learning new affairs. The application of multiple intelligences and the creation of diverse classrooms to develop students' specialty allowed students maintaining learning motivation with active participation, building self-confidence, and developing self-motivation. Minnier et al. (2019) mentioned that the application of multiple intelligences to teaching was different from traditional teaching; teaching with multiple intelligences adopted multiple instruction strategies and activities. Many studies indicated that the application of multiple intelligences to teaching enhanced students' learning motivation and interests. The following hypothesis is therefore proposed in this study.

H1: Teaching with multiple intelligences would affect learning motivation.

Moncada and Mire (2017) indicated that teachers had to know each student's strengths and traits and appreciate individual advantages to give guidance and inspiration in order to strengthen the learning confidence. Multiple intelligences reminded teachers to comprehend and apply diverse teaching methods, transform existing curricula, or units into multiple learning opportunities, as well as carefully consider the taught concepts and confirm the most appropriate intelligence for communicating the content before planning curricula in order to ensure the achievement of proper teaching goals and promote students' learning achievement. Awang et al. (2017) proposed that teaching with multiple intelligences could positively enhance students' academic performance to make progress on English listening, speaking, reading, and writing. After applying multiple intelligences to English teaching, students enhanced learning achievement, learning interests, and learning motivation. Several researchers proposed that students appeared positive change on the learning achievement. Khong et al. (2017) indicated in the research results that higher-grader students in elementary schools being taught science based on multiple intelligences outperformed those receiving traditional teaching. According, the following hypothesis is proposed in this study.

H2: Teaching with multiple intelligences would affect learning achievement.

Russell et al. (2017) considered that the achievement of meaningful and effective learning to skillfully grasp the concept relied on students' intrinsic motivation, when students expected to acquire certain knowledge with e-learning. Khow and Visvanathan (2017) considered the value of e-learning that students could enhance learning achievement by acquiring good performance and presenting intrinsic motivation to contact broad professional knowledge/competence. Hunter and Hunter (2018) stated that students with high learning motivation

presented more definite goals and strong desire to well-learn the learning content and showed higher expectation and better self-efficacy. It was also discovered that students with high learning motivation appear better performance, and students with intrinsic motivation outperformed those with extrinsic motivation. Consequently, the following hypothesis is proposed in this study.

H3: Learning motivation presents significantly positive effects on learning achievement.

METHODOLOGY

Measurement of Research Variable

(1) Teaching With Multiple Intelligences

Referring to Minnier et al. (2019), the following dimensions for the curriculum design of teaching with multiple intelligences, according to student needs, are proposed in this study.

1. Intrapersonal intelligence: Intrapersonal intelligence is defined as the intrapersonal ability according to individual self-knowing ability and self-perception to keenly and precisely perceive personal inner emotion, motivation, ability, intention, and desire.
2. Interpersonal intelligence: Intrapersonal intelligence is defined as being able to effectively perceive and discriminate others' emotion, affection, intention, feeling, motivation, and expectation as well as make proper responses to interpersonal relationship to further get along with people harmoniously.
3. Content-based curriculum: Content-based curriculum integrates knowledge and life, provides students with opportunities to apply knowledge, well-utilize community resources, and integrate community professional manpower for students learning with multiple intelligences and increasing learning channels.
4. Situated learning: Learning situations are co-constructed and maintained by teachers and students, are free, open, and cooperative, pay attention to overall conceptual knowledge orientation, and match students' sensory learning with teaching resources for learning in the real-life situation and respecting the difference in learners' learning outcome.

(2) Learning Motivation

According to the research of Cheng et al. (2018), students' learning motivation is divided into intrinsic learning motivation orientation and extrinsic learning motivation orientation in this study, as below.

1. Intrinsic orientation: containing favor of challenging courses, regarding learning as interest and hobby, considering that learning could expand vision, being able to actively learn new courses, learning for developing self-potential and realizing ideas.
2. Extrinsic orientation: covering learning for receiving others' affirmation, acquiring better performance, passing examinations or evaluation, showing off to others, competing with classmates, obtaining appreciation and attention from elders or the opposite sex, preventing from punishment and scold, avoiding the shame of failure, and entering ideal schools in the future.

TABLE 1 | Overall linear structure model analysis result.

Factor dimension/evaluation standard		Estimate
Teaching with multiple intelligences	Intrapersonal intelligence (α1)	1.00
	Interpersonal intelligence (α2)	0.99
	Content-based curriculum (α3)	0.97
	Situated learning (α4)	1.03
Learning motivation	Intrinsic orientation (β1)	1.00
	Extrinsic orientation (β2)	0.95
Learning achievement	Learning effect (σ1)	1.00
	Learning gain (σ2)	1.06
Teaching with multiple intelligences→ Learning motivation		0.383**
Learning motivation→ Learning achievement		0.345**
Teaching with multiple intelligences→ Learning achievement		0.291**

$^{**}p < 0.01$.

(3) Learning Achievement

Referring to Zebari et al. (2018), the following dimensions for learning achievement are proposed in this study.

1. Learning effect-including test performance, time for completing schedule, and term performance.
2. Learning gain-containing learning satisfaction, achievement, and preference.

Method and Model

Structural equation model is used as the research method in this study and Amos is utilized as the statistical tool. Structural equation model (SEM), also named covariance structure analysis, is used for analyzing causality model and precedes path analysis (PA), factor analysis, regression analysis, and analysis of variance. Structural equation model consists of two parts. The first part, measurement model, aims to construct the latent variable model with observed variables to understand the relationship between observed variables and latent variables; the constructed mathematical model is Confirmatory Factor Analysis (CFA). The second part, Structure Model, mainly discusses the causality among latent variables with path analysis, where observed variables are used; latent variables are used for Structure Model.

Research Subject and Sampling Data

Aiming at employees in Southern Taiwan Science Park as the research objects, total 314 employees in high-tech industry are preceded the 30-week (2 h per week for total 30 h) experimental research. The questionnaire survey is preceded after the end of the 30-week course, and statistical methods are applied to test various hypotheses. Among the distributed 314 copies of questionnaire, 297 copies are valid, with the valid retrieval rate 95%.

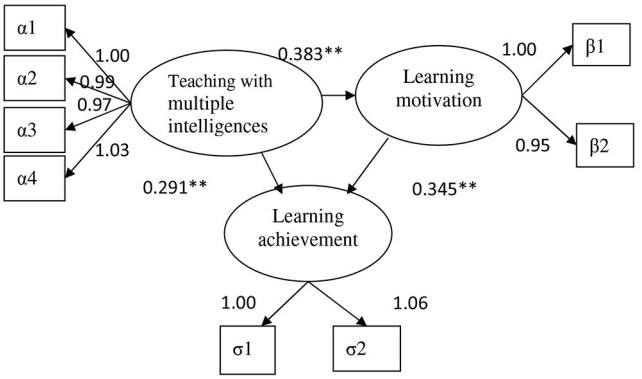

FIGURE 1 | Path relationship.

Reliability and Validity Test

Reliability and validity are important measurement standards. Merely the data results acquired from the questionnaire design with reliability and validity present the research value. AMOS is used for Confirmatory Factor Analysis (CFA) in this study, and SPSS 21 is applied to calculate the reliability and validity to test the questionnaire scale achieving the reliability and validity standard.

EMPIRICAL RESULT

Factor Analysis and Validity Analysis

Based on factor loadings, all items in this study are preceded confirmatory analysis. The factor loadings should be higher than 0.7; if not, the item does not show the representativeness and is removed. The Confirmatory Factor Analysis results show that all factor loadings of teaching with multiple intelligences, learning motivation, and learning achievement conform to the standard (>0.7), revealing high validity of the questionnaire scale.

Cronbach's α is used in this study for evaluating reliability; Cronbach's α higher than 0.7 achieves the reliability standard, and the ideal value should be higher than 0.9. Cronbach's α of teaching with multiple intelligences, learning motivation, and learning achievement in this study is higher than the suggested threshold and with the lowest value up to 0.8, revealing high reliability of the questionnaire scale.

Test of Model Fit

"Maximum Likelihood" (ML) is utilized in this study for the estimation; the obtained Amos analysis results achieve convergence. The indicators standing for the external quality of model show (1) χ^2 ratio $= \chi^2 = 1.627$, smaller than 3, (2) goodness-of-fit index GFI $= 0.97$, higher than 0.9 and adjusted goodness-of-fit index AGFI $= 0.82$, higher than 0.8, (3) root mean square residual RMR $= 0.029$, smaller than 0.05, and (4) incremental fit index 0.94, higher than 0.9. Overall speaking, the actual number of 297 samples is higher than the requirement for the basic number of samples, and the overall model fit indicators pass the test, fully reflecting good internal quality of the structural equation model.

Regarding the test of internal quality of structure, the squared multiple correlation (SMC) of manifest variables is higher than 0.5, revealing good measurement indicators of latent variables. Furthermore, latent variables of teaching with multiple intelligences, learning motivation, and learning achievement show the component reliability higher than 0.6 and the average variance extracted of dimensions is higher than 0.5, apparently meeting the requirement for the internal quality of model.

Test of Path Relationship

Latent variables of intrapersonal intelligence, intrinsic orientation, and learning effect are regarded as the reference indicators with fixed 1. From the causality path in **Table 1** and **Figure 1**, the estimates between other dimensions and variables appear significance. Interpersonal intelligence $= 0.99$ shows less explanatory power than intrapersonal intelligence, and learning gain $= 1.06$ presents better explanatory power than learning effect.

DISCUSSION

Teaching with multiple intelligences could effectively enhance the learning motivation of employees in high-tech industry to promote and continue the learning achievement. The research results are consistent with most of past research results (Ikiz and Cakar, 2010; Mahasneh, 2013). As Akkuzu and Akçay (2011) revealed, teaching with multiple intelligences was more effective than traditional teaching styles and such activities were interesting to facilitate students' interests in participation in course activities. In this case, the application of teaching with multiple intelligences allows employees in high-tech industry preceding learning activity with the advantageous intelligence to be more confident of learning challenges, rather than being inoculated to result in getting half the results with double efforts for learning with weaker intelligence, and further help promote the performance of organizational learning. The use of computers is inevitable for modern people; the use of ppt, films, or mv could properly attract the attention of employees in high-tech industry. Well-begun is half done; besides, computer-assisted teaching could largely assist employees in more difficult intelligence activity design, such as space, natural observer, and music intelligence. Teachers therefore should flexibly apply such resources. Moreover, teachers should take a long-term view, rather than focusing on immediate results. The cultivation of employees' active learning and high learning motivation would multiply and endure the learning validity.

CONCLUSION

The research results reveal that Consistent with most past research results, it reveals that teaching with multiple intelligences indeed could effectively promote learning achievement and motivation to learn (Gardner and Hatch, 1989; Barrington, 2004; Akkuzu and Akçay, 2011). Employees in high-tech industry remarkably enhance learning achievement and learning motivation after the teaching with multiple intelligences. In this case, relevant academic competition

could be held in organizations with proper rewards to effectively apply the employees' learning effectiveness and increase the learning motivation. Different from traditional teaching, teaching with multiple intelligences, with more personal practice and participation, allows employees in high-tech industry grasping the learning, rather than simply accepting knowledge. As a result, employees would enhance self-efficacy. For instance, employees in high-tech industry, under group learning, observation, and brainstorming, would make progress on reports, and learning comprehension as well as deepen and broaden learning motivation. Teachers, during the instruction, should praise and encourage for the progress of employees, create low-pressure, relaxing, and comfortable learning environment, and give more learning confidence to strength the learning motivation of employees in high-tech industry.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary materials, further inquiries can be directed to the corresponding authors.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the Ethics Committee of the Fuzhou Institute of Technology, with written informed consent being obtained from all the participants. All the participants were asked to read and approve the ethical consent form before participating in the present study. The participants were also asked to follow the guidelines in the form in the research. The research protocol was approved by the Ethical Committee of the Fuzhou Institute of Technology.

AUTHOR CONTRIBUTIONS

D-YL performed the initial analyses and wrote the manuscript. J-HC, C-MC, K-PH, and CJ assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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The Effect Failing to Perform Extracurricular Activities Has Had on School Culture and Values Education During the COVID-19 Pandemic

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Keywords: COVID-19 pandemic, distance education, school culture, values education, extracurricular activities

INTRODUCTION

During the COVID-19 pandemic, education has continued online almost worldwide. Understanding the nature of online learning and how it reflects on practices is essential for developing an effective international perspective for continuous improvement in learning and skills (Altinay et al., 2021). In school cultures, digital technologies forces leaders to establish a vision of effective use of technology. Digital leadership is not only use of technology; it is a strategic view of school culture to engagement and achievement (Altinay, 2015).

The concept of organizational culture has had a long history and is a subject of study attracting the attention of researchers from almost all branches of science (Yilmaz, 2019). Social interaction and culture have an important place in how schools acquire a corporate identity (Altinay et al., 2019). School culture forms based on the school community members' interactions with one another and acts as a guide for how members should behave toward one another in school (Işik, 2017). The basic values a school adopts; the stories experienced within a school's history; and that school's traditions, ceremonies, and symbols constitute the basic elements of school culture.

The changes and transformations in the hierarchy of social values through globalization have led to social problems in societies (Ersozlu et al., 2018; Koç, 2020). This has caused values to become prominent for the sustainability of universal peace and the standards of human life (Bayburt and Duman, 2020). In this context, one of schools' important duties is to have students gain the values included in their programs regarding the transfer of culture and values, to prepare students for life within the framework of these values, and to positively affect their character and identity formation (Cihan, 2014). Values education in schools is done not as a separate course but within the framework of a curriculum within all courses (Aydin and Akyol-Gürler, 2018). In this context, the aim is to impart the values to be transferred to students in schools not only in class but also in extracurricular social and cultural activities (Koç and Budak, 2021).

Many activities are carried out such as field trips, competitions, scouting, book readings, seminars, conferences, camps, tournaments, and picnics within the scope of values education. The purpose of these activities in and outside of school is to create environments where students are active, to activate many different senses, to learn by doing, and to even have fun (Yildirim, 2019). Students are believed to learn more from experiences in traditional classrooms by using education-related experiences carried out in out-of-school environments that contribute to students' socialization (Priest, 1986), and that positively affect their values (Selanik-Ay and Erbasan, 2016).

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This study has been conducted to examine the effect students' inability to participate in extracurricular activities due to the COVID-19 pandemic has had on how they adapt to school culture and acquire values. This study is important in terms of presenting results regarding not being able to hold the activities in schools during the COVID-19 pandemic that had previously been held for having students adapt to school culture, gain values, and socialize. In addition, the study is expected to be a guide for the adaptation process to implement for students after a 2-year hiatus due to the COVID-19 pandemic. This is because schools should guide their students in making the proper choices and should teach students the strategies to fulfill these choices in order to minimize the damage of the negative aspects the COVID-19 pandemic process has caused.

The problem of the research can be stated as, "How has students' inability to participate in extracurricular activities due to the COVID-19 pandemic affected how they adapt to school culture and to acquiring values?

MATERIALS AND METHODS

Study Design and Study Group

This research is conducted using a qualitative research model. Qualitative research models aim to provide an environment where in-depth research can be conducted with a group that is thought to reflect the problem situation (Büyüköztürk, 2019). In this context, the study focuses on questions of how and why regarding the research problem. After obtaining permission from the Near East University Scientific Research Ethics Committee, the participants were contacted and their opinions obtained. The participants provided the data in 2021, with their consent being obtained prior to the study.

The study group consists of 43 participants. The purposive sampling method of criterion sampling has been preferred in determining the participants. Criterion sampling works with participants who show the characteristics of predetermined criteria. The main point of criterion sampling is to select participants who are rich in information (Patton, 2018). When choosing the study group, having participants who work in different schools and in different positions and who have actively taught/administered during and before the COVID-19 process have been accepted as the criteria. The participants' characteristics are as follows with the abbreviations to be used in the article indicating these characteristics also being given: Of the 42 participants, 35 are teachers (T), 4 are assistant principals (A), and 4 are principals (P). Of the participants, 30 are male (M) and 13 are female (F); 27 are undergraduates (U), 13 have a master's degree (G) and 3 have doctorates (D). In addition, the participants work in eight different types of schools from primary school to high school, and their seniority distributions range from 5 to 25 years.

Data Collection Tool

Before creating the semi-structured interview form used in the study, opinions on the subject were received from teachers. In addition, a literature review was made in order to benefit from similar studies. The semi-structured interview form has open-ended questions and was presented to three faculty members who are experts in the field of qualitative research for their opinions. The final version of the interview form has the following six open-ended questions that were asked to the participants:

1. What activities were held in your school prior to the COVID-19 pandemic so that your students could get to know and adapt to the school culture?
2. What activities were held in your school prior to the COVID-19 pandemic so that your students could gain national values?
3. What activities were held in your school prior to the COVID-19 pandemic so that your students could gain spiritual values?
4. How has the inability of students to participate in extracurricular activities during the COVID-19 pandemic affected how they adapt to school culture?
5. How has the inability of students to participate in extracurricular activities during the COVID-19 pandemic affected how they acquire national values?
6. How has the inability of students to participate in extracurricular activities during the COVID-19 pandemic affected their ability to acquire spiritual values?

Data Analysis

The semi-structured interview forms were obtained from the participants and evaluated using content analysis, a qualitative research analysis method. The program MAXQDA 20.1.0 has been used in the content analysis of the data. Themes and codes were created using MAXQDA, and the results have been made more understandable through the use of a word cloud and figures. The following four main strategies of credibility, reliability, transferability, and verifiability have been used as the criteria for the validity and reliability of the qualitative findings (Yildirim and Simşek, 2016). Some of the methods applied for the validity and reliability analyses in this research include ensuring the diversity of data collection, conveying the findings with as many definitions as possible, informing the reader by presenting different views on the same theme, and presenting the research area and data set to field experts.

RESULTS

The themes and codes were created in accordance with the answers the participants gave to the six questions on the semi-structured interview form. In the qualitative analysis, a word cloud was first created based on the participants' opinions. Next, three themes were created based on these findings. The figures present both the code frequencies and the relationships between themes and codes.

Figure 1A presents the word cloud obtained from the participants' opinions. Accordingly, the participants' extracurricular activities were determined to have an effect on school culture and values acquisition; however, the participants can be said to have the opinion that this was a negative effecte during the COVID-19 process, as the words the participants most frequently repeated were students, activities,

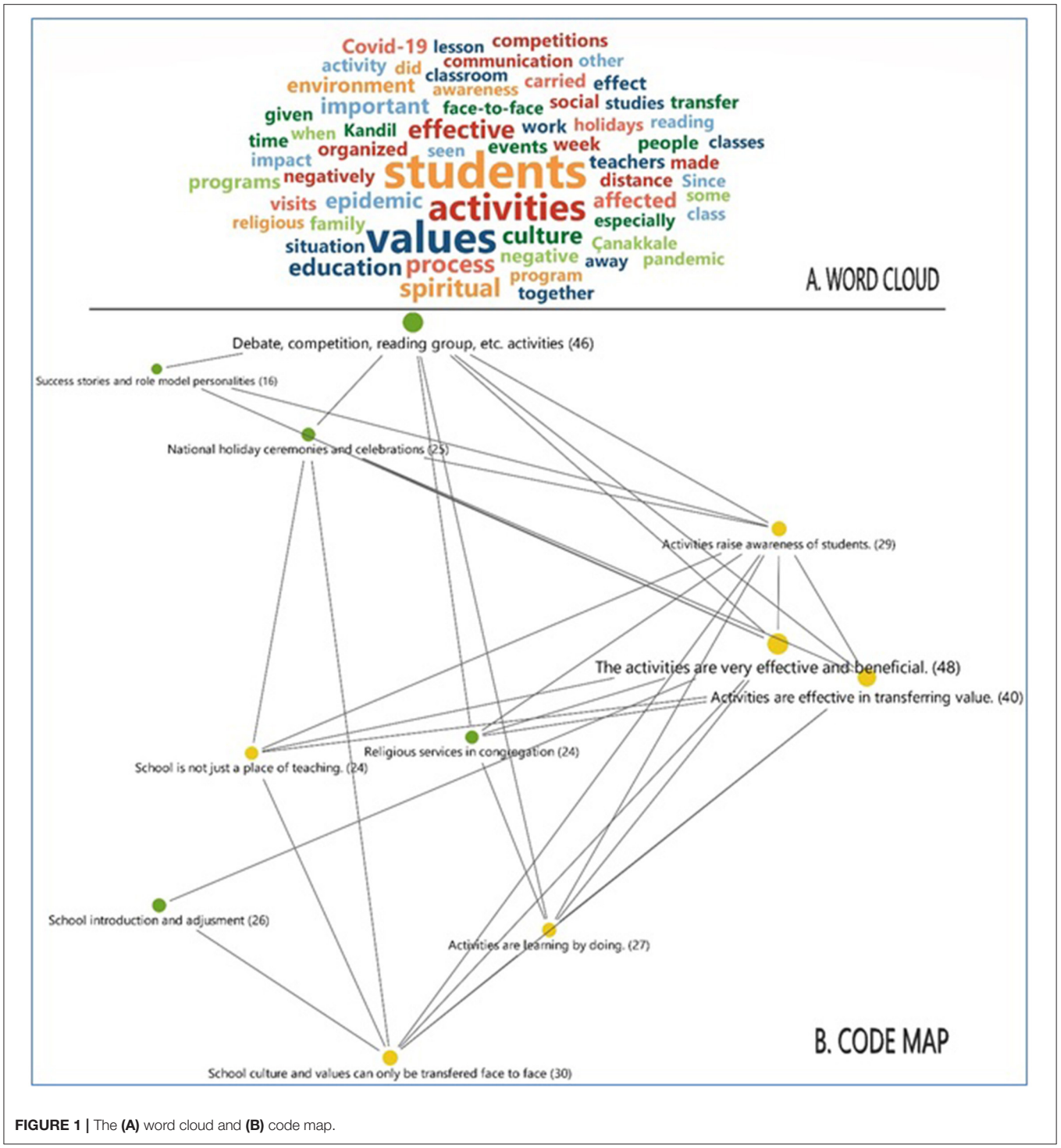

FIGURE 1 | The **(A)** word cloud and **(B)** code map.

values, effective, negatively, together, environment, pandemic, spiritual, culture, and face-to-face. **Figure 1B** presents the code map.

Figure 1B presents the code map describing the relationship between the effects of extracurricular activities on school culture/values acquisition and the activities implemented in schools. According to this map, the participants who feel the activities had a significant effect on the transfer of culture and values are seen to consider the activities held in their schools to have served this purpose. Almost every in-school activity has an intense relationship with culture and values transfer. For example, the participants who stated the activities to be important were determined to have significant relationship with codes from the other

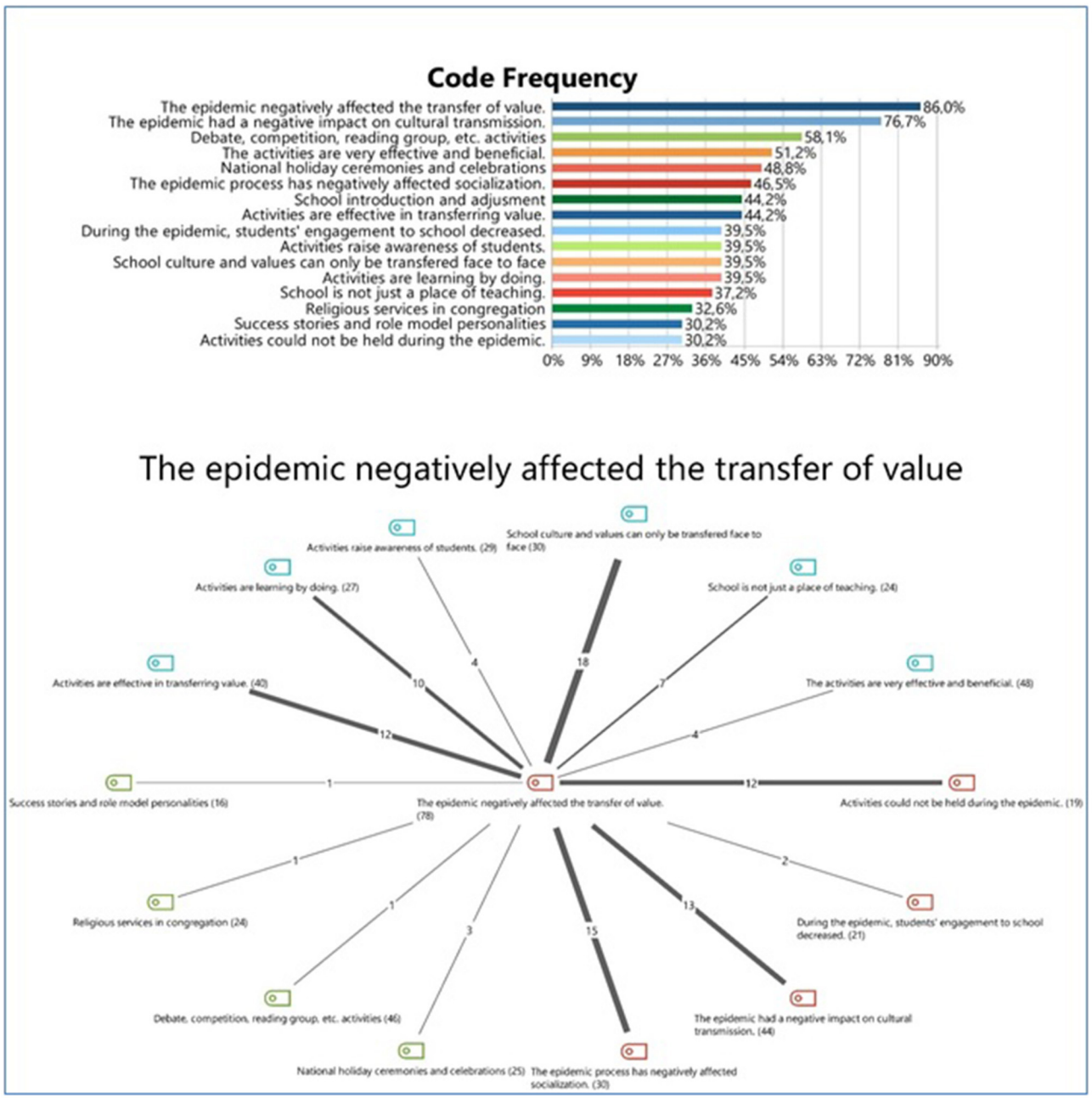

FIGURE 2 | Code frequencies.

theme such as debate, competition, school promotion, and success stories.

Themes and Codes

This section presents the themes and codes alongside the participants' opinions. Participants have also been coded with respect to their demographic characteristics. The definitions of these codes were explained in this article's section on the study group above. For example, TMU22 encodes teacher, male, undergraduate, and participant #22. Three themes have been created based on the participants' opinions. The first theme is the value and importance of extracurricular activities because the participants were first asked about the role activities had in conveying school culture and values. Five codes were determined for this theme by taking into account the areas in which the participants' views were most concentrated. All participants expressed the opinion that activities were very effective and beneficial. TMU22 said, "We can say that such values happen

every day, maybe even every lesson without being aware of these values in the school environment. Children learn to have these values without even realizing it." Under this theme, the participants pointed out that values, school culture can be transferred through activities, and that the school is not just a place for teaching but also a place for training. The point the participants emphasized with regard to the benefit these activities have is that these activities are a type of learning by doing, which is important for an effective education. TFG36 said, "Because peer education comes to the fore in the activities, one gains more information from one's friends and by seeing are more." TMG1 said, "Extracurricular activities allow students to more easily internalize and reinforce values by seeing and experiencing them in the field and in daily life." TMG28 said: "Learning by doing and through experience are most effective methods."

The second theme is the activities implemented in culture and values acquisition. Participants who had the general view that the activities affect school culture and values acquisition were asked which activities had been held in their school. The answers they given in general terms are: competitions, debate and reading groups, national ceremonies and celebrations, collective worship, school promotion and adaptation studies, talking about the lives of role models, and conferences given by field experts. Participants stated these activities to have been carried out in their schools with effective results. TMU24 said, "Thanks to activities like trips, exhibitions, and sports activities, students can feel like they belong to the school." PMG29 said, "Having the Gallipoli menu (only compote) being given in the school cafeteria is important so that the students can understand better what happened during the Gallipoli campaign in World War I." TMU22 said, "We took the leftover food from our school to people in need; we had a group of students give it to them. The school also had donation boxes and sponsored orphan efforts in each classroom. Spiritual values should be given by applying them, not just theorizing about them."

The third theme is adverse effects from the COVID-19 pandemic. While examining the activities' effects on school culture and values as the main subject of the article, educators were asked how the pandemic process had affected this since 2020. The vast majority of educators stated this process to have had negative impacts on transferring values and school culture to students, on socializing students, on students' commitment to school, and on the activities that had been previously held for these purposes. A small number of participants stated the pandemic process to have also had positive effects, such as orienting students toward spirituality and maturing them. In other words, the students said that the pandemic had caused them to think more deeply about issues such as cleanliness, death, illness, and prayer. TMU14 said, "Socialization is one of the most important elements of education; without it, the sense of belonging to a group/school does not develop." TMG27 said, "Students couldn't benefit from the psychology of being schooled because they're always home. School definitely has an effect on people." TMU24 said, "Children trapped at home have become unable to empathize with others."

Among the codes created based on the participants' opinions, two codes were repeated most frequently repeated and have the most significant relationship with the other codes; these are: the COVID-19 pandemic had negatively affected the transfer of values, and COVID-19 pandemic had negatively affected the formation of school culture. Almost all participants focused on these two issues.

Figure 2 shows the frequencies of the codes obtained from the interviews and the relationships among the frequencies. As **Figure 2** shows, the data obtained as a result of the answers participants gave reveal the following: Extracurricular activities have an indispensable importance in the transfer of school culture and values. These activities had largely been held in schools prior to the COVID-19 pandemic. However, distance education, which has been implemented during the COVID-19 pandemic, has led to social, sportive, and cultural activities being unable to be organized. As a result, students now have deficiencies adopting school culture, committing to school, knowing values, and living their lives in accordance with values. Both educators and families will need to work harder and rehabilitate children in the wake of the COVID-19 pandemic. The most striking result of this research is that extracurricular activities will play an important role in this rehabilitation work.

DATA AVAILABILITY STATEMENT

The datasets presented in this study, other related graphs and tables can be found in the online repository. The name and access address of the repository is OSF (version number 20210913): https://doi.org/10.17605/OSF.IO/WZSP4, https://osf.io/wzsp4/?view_only=dee0e6849c1d41cda7d6fd02eebdb3b0.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Near East University Ethical Committee Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SK: conceptualization, methodology, investigation, resources, and writing/original draft preparation. AK: validation, writing/review and editing, visualization, supervision, and project administration.

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BRIEF RESEARCH REPORT
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Key Factors in the Application of Sharestart to Enhance the Learning Attitude of Students

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Under the background of globalization and the popularity of distance learning ande-learning channels provided on the Internet, teaching methods that encourage the self-directed learning of students are becoming popular. There is an increasing number of domestic teachers joining in the practice for change. The various teaching methods that make the students acquire critical thinking skills can be summarized as learning by doing, critical thinking learning, multiple assessments, team discussion teaching, and cooperative learning. With the teachers of the universities in Shanghai as the questionnaire analysis objects, a total of 360 copies of questionnaires were distributed, and 256 valid copies were retrieved, with the retrieval rate of 71%. The research results are summarized as follows. (1) The "mental adaptation and engagement of students" is the most emphasized dimension, followed by the "professional development of teachers," "administration and parent support," and "material and teaching strategy." (2) The top five emphasized indicators, among 14, are the ordered cultivation of self-study and thinking habits, the development of the professional community for the collaborative lesson study of teachers, the support and cooperation of the president and the administration, adoption of heterogeneous grouping, and co-learning, discussion and cooperative learning. According to the results, it is expected to propose more definite practice directions for teachers intending to attempt such a teaching method, as well as provide some specific suggestions for the first movers of Sharestart.

Keywords: Sharestart, teaching method, learning attitude, key factor, educational policy, educational resource

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INTRODUCTION

There are various teaching methods for teachers. Being limited to time, the common teaching method among teachers is narrating and organizing points in class, forcing students to recite and memorize. More than 56% of teachers agree that such a teaching method could not assist students in independent thinking. Traditional spoon-fed teachings could easily become one-way memory. When teachers concentrate on the preparation of lectures but do not grasp the real learning absorption of students, it becomes a factor in bad learning effectiveness in students that may result in them losing interest and attention. However, in order to completely teach the curriculum content in a short period and reassure the students and parents, most front-line teachers still

adopt the traditional didactic teaching. Fortunately, under the background of globalization, with the application of information technology, it became more common to provide distance learning and e-learning channels on the Internet. Berigel (2017) stated that quality must be evaluated regarding the components of distance education, context, and organization. Teaching methods to encourage the self-directed learning of the students therefore emerged, and a lot more domestic teachers are joining in the practice and change. The various teaching methods that make the students acquire critical thinking skills can be summarized as learning by doing, critical thinking learning, multiple assessments, team discussion teaching, and cooperative learning. Students could clarify the difference between personal ideas and the idea of others through thinking, analysis, criticism, opinion expression, and peer interaction, to achieve critical thinking ability. Sharestart aims to cultivate the abilities of students concerning self-study, reading, thinking, discussion, analysis, induction, expression, and writing; stresses on returning the learning power to learners; and inserts the clear spring of reform into education. Researchers, in past years, have proved that Sharestart could enhance the reading comprehension of students, and the longer times for practice greatly improve the ability that students could present (Chen et al., 2016). Moreover, it could enhance learning interests and motivation, cultivate the self-learning ability of students (Lone and Lone, 2016), enhance thinking level and problem-solving ability (Asha and Al Hawi, 2016), as well as effectively cultivate the teamwork of students, and enhance curriculum participation (Pratibha, 2017) to promote presentation expressions and oral expression abilities (Chen and Yao, 2016). Despite the rich research results in the past, it seemed to focus on the possible effects of the practice of Sharestart with various research methods, such as action research, experimental research, questionnaire survey, case study, and qualitative research, to discuss the difference before and after the practice Sharestart, while the factors in the learning effectiveness of Sharestart are seldom emphasized. Most past research on the learning effectiveness of Sharestart indicated that Sharestart could positively and effectively enhance learning effectiveness, but some research results revealed no significant difference. It revealed that Sharestart was not the absolute effective teaching method; it seemed that there were potential factors in the effectiveness of Sharestart that were neglected in past studies and seldom discussed.

As a result, the key factors in the promotion of learning attitude in Sharestart are discussed in this study, expecting to propose more definite practice directions for teachers intending to adopt the teaching method and provide some specific suggestions for the first movers of Sharestart.

LITERATURE REVIEW

Sharestart

Chen et al. (2017) explained Sharestart as teachers preparing sufficient handouts and materials for the self-study of students, designing good questions for the thinking of students, and having students learn accurate expression through constant asking. The idea was to create a teaching method that allows for the self-learning of students and trains the abilities of students to self-study, read, think, discuss, express, and write. Taggart (2018) explained it as teachers producing problem-oriented handouts for the new learning model of "cooperation and competition" among student teams, returning the stage to students and transforming teachers into hosts or guides, as well as giving the power in the learning process back to students to facilitate their learning interests, increase their various abilities, and enhance the comprehensive abilities of reading, thinking, expression, and writing. Sharestart, therefore, was the best method to train the self-expression, style, and thinking of students. Azizan et al. (2018) mentioned that to apply Sharestart, teachers had to prepare sufficient data for the students to self-study, design good questions for the thinking of the students, and constantly ask questions for students to learn accurate expression. Sharestart allowed the students to become the main characters, and curiosity and thinking were the optimal power for the learning of students.

Sharestart Key

Kim (2018) introduced the three operation details and the key of Sharestart.

(1) Brand-new production of "problem-centered" handouts

The handouts should be started from texts and extended to extracurriculars, as well as from simple to a gradual increase in difficulty, width, and depth. The handouts should be problem-centered; a piece of data is to be provided for a question; and, the data should be divided into sections to be read in short periods and concentrating on the focus of the discussions. The handouts should be increased in depth step by step so that students could learn from shallow to deep, from easy to difficult, and from narrow to broad for larger results.

(2) Student grouping

The idea of grouping comes from the learning community, which stresses random and male-female mixed collaborative learning. Grouped cooperative learning in Sharestart is done in heterogeneous groupings, providing peer learning, mutual help, and the power of diligence, which are the key success factors in Sharestart. After grouping, the group members would get nervous together, and the classmates in other groups would carefully listen to the lesson for evaluation. The entire class is learning under such a state while getting points and being evaluated, as well as honing their skills and attention in narration and listening.

(3) Guide for teachers

With Sharestart, merely enough data are provided for students, and other three-quarters are acquired through the self-study of students by reading, thinking, expression, and writing to cultivate and enhance their basic capabilities as well as retain their learning interests.

TABLE 1 | The overall weight of key factors in the enhancement of learning attitude with Sharestart.

Dimension	Hierarchy 2 weight	Hierarchy 2 order	Indicator	Overall weight	Overall order
Professional development of teachers	0.258	2	Development of a professional community for the collaborative lesson study of teachers	0.112	2
			Questioning guide and mastering discussion time	0.085	6
			Real-time feedback and generalization	0.034	13
			Open classroom	0.052	10
Material and teaching strategy	0.226	4	Production of problem-oriented handouts	0.069	8
			Adoption of heterogeneous grouping	0.098	4
			Making good use of an award system	0.022	14
			Application of multiple assessments	0.038	12
Mental adaptation and engagement of students	0.277	1	Cultivation of self-study and thinking habits	0.128	1
			Co-learning and discussion and cooperative learning	0.091	5
			Training the ability of publishing on stage	0.057	9
Administration and parent support	0.239	3	Support and cooperation of president and administration	0.106	3
			Encouraging teachers to participate in related studies	0.075	7
			Parents agreeing with and supporting teaching	0.043	11

Factors in Learning Attitude

In addition to the intelligence factor, Lin et al. (2017) proposed four major factors in learning attitude.

(1) Psychological factors: individual motivation of achievement, personality traits, self-concept, anxiety, personal mental adaptation, attitudes, and learning habits.
(2) Physiological factors: health conditions, visual, and hearing impairments.
(3) Social factors: family background, parents' occupation, education attitude, cultural background, and community cultural value.
(4) Educational factors: teaching methods, curriculum contents, and teaching materials.

Pai et al. (2020) pointed out the intervening variables in predicting educational achievement with the background of the students; the social hierarchy of the family of the students would not directly affect the educational achievement, but the material conditions, intelligence factors, motivation of achievement, level of ambition, education attitude, cultivation styles, value and concept, language styles, and learning environment (Cenk and Deniz, 2018) could intervene.

Üzüm and Pesen (2019) proposed three factors in learning attitude.

(1) Learner factors: ability, motivation, and development level.
(2) Teacher's teaching factors: teaching hours, teaching methods, and teaching quality.
(3) Surroundings factors: family, classroom environment, and peer relationship.

Lawrence and Hanitha (2017) directly classified the factors in the learning attitudes of learners into five categories.

(1) The personal factors of the pupil: the personal psychological and physiological factors of the pupil.
(2) The family factors of the pupil: family background, family educational resource, parents' occupation, socioeconomic status, educational value, educational expectation, parent–child interaction, language type, cultural capital, and community cultural value.
(3) The teaching factor of the teachers: the teaching styles, teaching expectation, teaching methods, teaching beliefs, material content, curriculum arrangement, class management, and class culture of the teachers.
(4) School environment factor: The curriculum plan of the school, extra-school activity, teaching resources, school size, reward and punishment system, local of school, school climate.
(5) Governmental policy factor: educational policy, educational resource, environmental indicator, and result indicator.

Rani (2017) generalized the opinions of several researchers and proposed five major factors in learning attitude.

(1) Student factors: learning motivation, learning strategy, learning ability, learning style, intelligence quotient, prior knowledge, self-efficacy, learning participation, age, and gender.
(2) Teacher factors: teaching method, teaching attitude, evaluation method, and teacher–student interaction.
(3) Material factors: curriculum design, material and language, and material content.
(4) Family factors: parents' socioeconomic status, parents' education, cultivation methods, and teaching styles.
(5) Other factors: learning environment, residence area, and information integrated teaching.

Saglam and Arslan (2018) generalized the factors in learning attitude into individual factors, overall factors, and contextual factors.

(1) Individual factors: individual background factors (covering gender, cultural capital, and socioeconomic status of parents) and personality trait factors (including self-expectation, learning motivation, interests, and anxiety).
(2) Overall factor: the town where the school is located, geographic location, the school attendance of students, school size, climate, and resources.
(3) Contextual factors: referring to peer effect, teacher effect, and class culture.

RESEARCH DESIGN AND METHOD

Delphi Method

The analytic hierarchy process dimensions in this study are built according to the Delphi method. The Delphi method, also named expert survey, applies communication to send questions to various experts, inquire for opinions, and collect all the opinions of the experts to organize them into comprehensive opinions. The comprehensive opinions and predicted questions are returned to the experts for their feedback and further opinions. The experts would modify the original opinions according to the comprehensive opinions. With several times of inquiry, the consistent predicted results are acquired step by step. Such a method presents that broad representativeness and is more reliable.

Analytic Network Process

The analytic network process, which is mainly applied to decision-making problems, is derived from Analytic Hierarchy Process (AHP) to cope with the situations in real society. Many decision-making problems cannot be expressed with the AHP structure, mainly because there are network relationships among the upper, middle, and lower hierarchies in real situations, rather than top-down linear relationships. Data from fast literature revealed that most affairs or principles related to people presented mutual dependency. For this reason, it is more appropriate to analyze with ANP than AHP in this study to better meet the practical needs.

Establishment of Indicators

The questionnaire in this study was sent to experts in various fields through email, and an expert conference was called to develop the key factors in the enhancement of learning attitudes with Sharestart, containing the professional development of teachers, material and teaching strategy, the mental adaptation and engagement of students, and administration and parent support. Such key factors were used as the ANP dimensions, and the ANP questionnaire was built with the corresponding classifications as the criteria. The research criteria through the modification of the Delphi Method are shown below.

(1) The professional development of teachers: the development of the professional community for the collaborative lesson study of teachers, questioning guides and mastering discussion time, real-time feedback and generalization, and open classroom.
(2) Material and teaching strategy: the production of problem-oriented handouts, adoption of heterogeneous grouping, making good use of an award system, and the application of multiple assessments.
(3) The mental adaptation and engagement of students: the cultivation of self-study and thinking habits, co-learning and discussion and cooperative learning, and training the ability to publish on stage.
(4) Administration and parent support: the support and cooperation of the president and administration, encouraging teachers to participate in related studies, and parents agreeing with and supporting teaching.

Research Subject

A total of 64 regular institutions of higher learning in Shanghai, including 39 universities and 25 colleges were selected. The Army Naval Medical University (Second Military Medical University, Shanghai, China) which started to recruit students without military status in 2018, was included in the list to have a total of 65 schools with 40 universities. For the analysis, 300 copies of the questionnaire were distributed to the teachers of the universities in Shanghai, and 256 valid copies were retrieved, with a retrieval rate of 71%.

DATA ANALYSIS RESULT

After completing all hierarchical weights, the indicators were distributed according to their relative importance to show the importance of indicators in the entire evaluating system. The overall weight of the factors in learning attitude with Sharestart are generated, as shown in **Table 1**.

DISCUSSION

The premise to request for the active learning attitude of students relies on the students being able to understand with self-reading without comprehension difficulty. In this case, the provision of more comprehensible data or a large quantity of supplements is necessary. Teachers could consider teaching some content in advance and then ask the students to self-study. Most of the

provided data could be studied in class and the quantity of the additional materials will depend on the difficulty and importance of the lesson, and all data are divided into small units. Students are not requested to recite, and the reading time is not long; the point will be to think. In this case, the goal of the cultivation of self-study and thinking habits are "quality" not "quantity," "depth" not "floating," and "cultivation of ability" not "recitation of knowledge" as well as having self-study and reading become the learning attitude of students. Meanwhile, administration departments of schools should plan time for the lesson co-preparation of teachers, with teaching teams for brainstorming and resource sharing, and give support and assistance as much as possible. Teachers are encouraged to observe lessons from other places or guidance groups of regional education units, and professional Sharestart lecturers are introduced to assist in the instruction in schools. The cooperation, observation, and reflection among teachers will result in the practical work being operated smoothly, teachers receive backing support, parents present better agreement and affirmation, and students enhance their learning attitude. Teachers, through professional learning communities and interaction and discussion with other teachers in the same fields, could cohere to the professional literacy, collaboratively make unit learning handouts (lesson preparation), and study how to operate Sharestart and precede teaching observation (lesson observation), as well as precede discussion and review after classes (lesson study). The promotion of the professional literacy of teachers aims to reinforce the active, effective, continuous, and deepen the learning attitudes of students and to return classroom focus to the learning attitudes of students. When adopting heterogeneous groupings, teachers should make complements of the difference among group members, arrange the students such that those with higher ability sit in the middle to assist their classmates with weaker levels of ability, and regularly change groups to provide the disadvantaged students with opportunities to learn from peers and excellent students for deepening the learning attitude. In this case, heterogeneous grouping does not simply encourage teamwork of the students, but also encourages competition among groups; peer stimulation and constraint could enhance the learning attitude and performance of students at different levels.

CONCLUSION

According to the empirical result analysis, the following conclusions were acquired.

Among the dimensions in Hierarchy 2, the "mental adaptation and engagement of students," weighted 0.277 and is about 27.7% of the overall weight making it the most emphasized dimension, followed by the "professional development of teachers" (weighted 0.258), "administration and parent support" (weighted 0.239), and "material and teaching strategy" (weighted 0.226). Accordingly, the mental adaptation and engagement of students is the most emphasized dimension in the enhancement of learning attitudes with Sharestart. From the overall weights of the factors in the enhancement of learning attitudes with Sharestart, the top five emphasized indicators, among 14, are the cultivation of self-study and thinking habits, development of a professional community for the collaborative lesson study of teachers, the support and cooperation of the president and administration, adoption of heterogeneous groupings, and co-learning and discussion and cooperative learning.

The research results reveal that the "mental adaptation and engagement of students," with the highest significance, is considered as the major factor by experts. The success of Sharestart lies in the mental adaptation and engagement of students such that the cultivation of the abilities of students to self-study, co-learn, and publish on stage is important, and there should be more investments in educational resources. The effective enhancement of the mental adaptation and engagement of students could be started from "administration and parent support" and the "professional development of teachers," with the president leading the promotion of Sharestart, the full support of the administration, and the concept of communication with parents for better comprehension, support, and agreement. Moreover, the promotion of Sharestart teachers in professional fields to receive encouragement and present passion could enhance the enthusiastic engagement of students and encourage them to acquire achievement and self-confidence from learning. What is more, multi-activation materials and teaching strategies should be adopted to enhance the automatic, interactive, and common-good learning of students.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the Ethics Committee of the Guilin University of Technology, with written informed consent being obtained from all the participants. All the participants were asked to read and approve the ethical consent form before participating in the present study. The participants were also asked to follow the guidelines in the form in the research. The research protocol was approved by the Ethical Committee of the Guilin University of Technology.

AUTHOR CONTRIBUTIONS

Y-ZL performed the initial analyses and wrote the manuscript. ZF, L-JS, and JZ assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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frontiers in Psychology

BRIEF RESEARCH REPORT
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Effects of Defense Suppliers' Practice of Online Character Education on the Employees' Learning Motivation and Perception of Integrity During COVID-19

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The 21st century marks a period where the pursuit of innovation, the advance of information media, and diverse values have gained great significance. In the face of information, economic impacts, and other challenges, developed countries in particular have come to emphasize online character education, as cultivating the people's character to have a positive attitude toward life. Teaching people desirable core values and moral thinking to cultivate pleasant character could enhance personal happiness and social harmony, boost national competitiveness, and be the key to a more harmonious society in the future. Education is the stable rock of ethics and morality, and like the foundation upon which to build a house, an unstable rock would result in the danger of collapse. People's sense of propriety, justice, integrity, and honor, as well as morality, is in decline. In such a social climate, online character education plays an extremely important role. Taking employees of defense suppliers for the Ministry of National Defense, Taiwan, as empirical subjects, 226 employees proceeded with our 20-week (4 h per week, for a total of 80 h) experimental teaching research. The research results reveal that: (1) online character education would affect learning motivation, (2) online character education would affect the perception of integrity, and (3) learning motivation presents significantly positive effects on the perception of integrity. Our results suggest that online character education and discussion is expected to help defense suppliers cultivate good social interaction skills and character to build harmonious interpersonal relationships.

Keywords: defense supplier, online character education, learning motivation, perception of integrity, affective components

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INTRODUCTION

Rapid change in society, changes in family structure such as the increase in single-parent families, and the decline of traditional family functions can cause non-standard behavior and challenging personalities as entire social norms and value structures are being relaxed or weakening. In view of the modern change in social values, social problems increase much more than in past years.

Furthermore, adolescent delinquent behaviors are fast becoming a headache for parents and teachers, as school education is left to deal with this great crisis. The spirit of respect for teachers disappears, with many teachers complaining regarding the difficulty in being teachers, and they feel helpless to discipline wayward adolescents. In terms of "character and education," the loss of positive character is most alarming and worrying. Education is the bedrock of ethics and morality, and much like the foundations of a house, a solid structure reduces the danger of collapse. People's sense of propriety, justice, integrity, and honor, as well as morality are in decline nowadays. Online character education plays an extremely important role in such a social climate. Hence, the 21st century is a time where the pursuit of innovation, the advance of information media, and diverse values gain paramount importance. In the face of information and economic impact and challenges, developed countries in particular stress on online character education, as cultivating the people's sound character to have a good attitude toward life and teaching the people positive core values and moral thinking could cultivate good character and create personal happiness and social harmony, boost national competitiveness, and be the key in a more harmonious society in the future. The advance of information media results in sex, and violence, and utilitarian values on the media negatively affect people's character. Current education presents excessive formalization and doctrine but ignores the value of moral education. It is therefore important to plan online character education curricula, teach people positive moral thinking, and cultivate a sound personality to promote people's character and encourage a benign climate within society.

In recent years, online learning has been flourishing. It has been almost 2 years since the major outbreak of COVID-19. Technological advancements have allowed online teaching to become the new normal. Distance teaching includes online teaching, e-learning, and online learning. It means that teachers and students interact with each other through the communication network, computer network, and video calls. Students are not confined to time and place since they don't have face-to-face lectures. The courses could be asynchronous or synchronous and therefore secure undeniable advantages concerning immediacy, convenience, and variety. Many people's lives are affected by the pandemic. Some saw their vacations, business trips, or weddings canceled, while others became exposed to the risk of job loss, suffering pay cuts, or being forced to take unpaid leave. In this period, personal safety protection is the immediate priority. Nauzeer and Jaunky (2021) segmented online moral education into four levels; The third level "sincere" comes from self-discipline, enterprising, introspection, gratitude, and perseverance. These qualities can improve the ability for self-improvement and respect, understanding, and appreciation of others (Bialik et al., 2015). On the other hand, Brooks (2001) believed that ten character traits should be prioritized, including public morality, cooperation, responsibility, help, respect, care, justice, trust, gratitude, and introspection. As stated above, the research of the core values around introspection and self-reflection is deficient (Djiwandono, 2016). For this reason, the effects of defense suppliers' practice of online character education on their employees' learning motivation and perception of integrity are discussed in this study, and are expected to help defense suppliers cultivate good social interaction skills and character to build harmonious interpersonal relationships.

LITERATURE REVIEW AND HYPOTHESIS

Broadly speaking, Hua (2019) regarded online character education as all activities preceded in informal curricula, aiming to teach students to become good-hearted people. Narrowly, online character education referred to special character training, teaching by matching special values and learning activity with children's nature and learning styles, to effectively enhance students' learning motivation. Rissanen et al. (2018) proposed that online character education should develop the relationships of respect, openness, and caring for teachers and students, provide various opportunities and design situations with plans for implementing morality, and positively encourage students' performance to enhance learning motivation and effectively facilitate morality growth in order to establish harmony within society and the basis of advancement. Phillippi and Lauderdale (2018) described online character education as the process to educate students to enhance individual good traits, recognize virtue, learn virtue, and do well, as well as internalize good habits. Therefore, recognizing virtue, appreciating virtue, doing good, and cultivating positive morality through education and learning allowed students to present behaviors conforming to social norms and value identity, as well as to demonstrate self-reflection skills to effectively enhance their learning motivation. The following hypothesis is therefore proposed in this study:

> H1: Online character education would affect learning motivation.

Pintrich (1989) stated that the practice of character education through schooling, family, and social education allows students to know good and do good. They will be able to internalize honesty and turn it into a habit. It is also the process of cultivating students to conform to social morality standards. It stresses the process of having students perceive the value of character from experience and further practice character, expecting students to be able to spontaneously practice good character in daily life as the final goal. Drake and Reid (2018) mentioned that online character education, through the teaching and learning process, facilitated individuals to develop ethical responsibility and caring, and by teaching students important core ethical values, effected the promotion of interpersonal relationships with caring, honesty, responsibility, and mutual respect. Sari (2019) indicated character education is defined as a direct oral method to inform what can be done and what cannot be done and to teach children to obey and practice. Besides, children's behaviors are directly supervised with lessons. It is important to teach children to get used to compliance, honesty, benevolence, sincerity, and trust for their positive

development. Accordingly, the following hypothesis is therefore proposed in this study.

> H2: Online character education would affect the perception of integrity.

Liao and Hsu (2019) discovered that the positive effects of intrinsic goal orientation, work value, self-efficacy, expected success, and locus of control in learning motivation on academic performance showed notable correlations with the perception of integrity. Pohan and Malik (2018) indicated that learning motivation could facilitate pupils to continuously and positively pursue online character education performance, interpersonal relationships, and assistance from others in acquiring successful experiences for self-affirmation and the establishment of the perception of integrity. Soleimani and Lovat (2019) mentioned that students would show different learning motivations according to past performance experience, vicarious experiences, verbal persuasion from others, and emotional responses; from the observation of peers' learning, online character education could guide students to establish self-confidence through successful learning experiences and provide students with support and affirmation in the learning process, as well as positively create good learning situations to have students know and understand the process and affect the learning motivation to enhance the perception of integrity (Wall and Leckie, 2017). In this case, the following hypothesis is proposed in this study.

> H3: Learning motivation shows significant and positive effects on the perception of integrity.

METHODOLOGY

From the above literatures, it is considered in this study that there is relevance among online character education, learning motivation, and integrity perception. The influence path and the hypothesis test are therefore organized in this study as **Figure 1**.

Measurement of Research Variable

Learning Motivation

Referring to He (2019), students' motivation in the learning process constitutes the components of value, expectancy, and affection.

1. Value components: Referring to students' belief in the importance and value of engaging in the learning activity, including goal orientation and work value. The components of value include intrinsic goal orientation, extrinsic goal orientation, and work value.
2. Expectancy components: Referring to students' belief in the ability to complete learning and smoothly achieve the expectancy of learning, including learning self-efficacy, expected success, and locus of control.
3. Affective components: Referring to the feeling and emotional response to personal ability in the learning process and result.

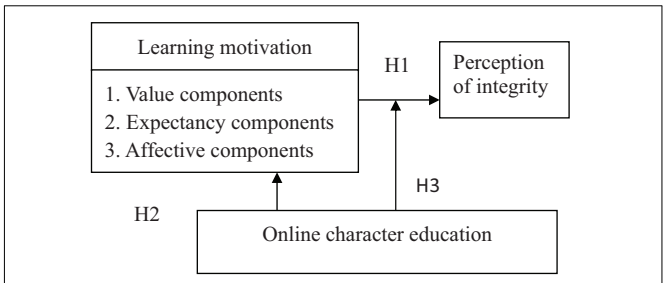

FIGURE 1 | Conceptual framework.

Perception of Integrity

The Honesty Scale proposed by Feng (2019) is used for measuring the perception of integrity in this study.

Research Subject and Sampling Data

Taking employees of defense suppliers for the Ministry of National Defense, Taiwan, as the empirical subjects, 226 employees proceeded with the 20-week (4 h per week, for a total of 80 h) experimental teaching research. The data are analyzed with SPSS, and factor analysis, reliability analysis, regression analysis, and analysis of variance are utilized for testing various hypotheses.

Analysis Method

The goodness-of-fit test with the LISREL model is generally measured from overall model fit (i.e., external quality of model) and the internal quality of the model. The common fit indices for the test of overall model fit contain (1) "χ^2 ratio" (Chi-Square ratio), standing for the difference between the real and theoretical model and the expected value, which is better if smaller than three, (2) the closeness of the goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) to one shows the better fit, (3) root mean square residual (RMR), reflecting the square root of "fit of residual variance/covariance mean," which is better when smaller than 0.05, and (4) the incremental fit index (IFI) if higher than 0.9 reveals good model fit.

Reliability and Validity Test

Validity refers to the measurement scale being able to measure what a researcher intends to measure. General types of validity include "content validity," tending to qualitative verification, "criterion validity," using known external criterion and the correlation coefficient of the test for the evaluation, and "construct validity," for evaluating the measurement of the theoretical consistency of the measurement to other observable variables. The questionnaire content in this study is based on past theories and refers to the real situations of research subjects to design a measurement tool to truly express the essence of affairs with complete representativeness to ensure the validity of the content. Moreover, the final commonality estimate of factor analysis results is applied to test the construct validity of items, and the obtained validity appears in 0.8∼0.9, revealing a good validity test of the questionnaire in this study.

EMPIRICAL RESULTS

Model Fit Test

"Maximum Likelihood" is utilized in this study for the estimation, and the analysis results achieve convergence. Results illustrate that the model fit indices in **Table 1** pass the test, fully reflecting the good external quality of the model.

Test of Path Relationship

In terms of the test of the quality of the internal model, the squared multiple correlation (SMC) of manifest variables is higher than 0.5, revealing good measurement indicators of latent variables. Furthermore, latent variables of online character education, learning motivation, and integrity perception show a component reliability higher than 0.6, and the average variance extracted of dimensions is higher than 0.5, apparently conforming to the requirement for the internal quality of the model.

The model analysis results reveal positive and significant correlations between online character education and learning motivation (0.846), learning motivation and integrity perception (0.871), as well as online character education and integrity perception (0.863) that H1, H2, and H3 are supported.

DISCUSSION

The research results reveal the importance of online character education. Defense administrative units could invite online character education professional communities and teams of teachers in various fields to discuss the promotion of online character education in defense units, design online character education-oriented curricula, and select material suitable for defense units to facilitate a conducive atmosphere for online character education to enhance the effectiveness of online character education. Character education teachers could utilize social resources, such as online character education resource platforms, teaching plans in the papers in the National Digital Library of Theses and Dissertations in Taiwan, online character education materials in Rainbow Family, Dandelion magazine, Jing Si Aphorisms, Observing Merits, and Appreciating Kindness, films on YouTube, advertisements, or news, to reduce lesson preparation time and the efforts of designing lesson plans and to achieve good learning effectiveness using half the effort for twice the result. Tyra (2012) explained that national defense suppliers should promote their activities and campaigns during leisure or meeting time according to the core value of the current month. They should promote online moral education and develop a good moral environment to deepen the impressions of employees working in national defense administrative departments. This would be helpful for those employees in real life as well (Ong'ong'a, 2021). According to the core value of the current month, they will be able to find articles about relative events and people. Reading examples could be a way to deepen employees' cognition and approval about the current online moral education. By internalizing the knowledge, it can enhance the moral literacy of employees in national defense suppliers and create a working environment with a superior moral culture (Peterson, 2020). Well-designed databases could provide the latest and most accurate information access routes to solve the problems in obtaining teaching materials in cases where specific practice or training appears to be lacking. Connecting with relevant teaching resources and online character education promotion and successfully integrating these relevant resources and materials could provide reference of normative samples for successive defense units or teachers.

TABLE 1 | Model analysis result.

Overall fit	Evaluation indicator	Judgment standard	Result
	p-value	*p*-value > 0.05	0.000
	χ^2/d.f.	<3	1.755
	GFI	>0.9	0.963
	AGFI	>0.9	0.911
	CFI	>0.9	0.946
	RMR	<0.05, <0.025 excellent	0.017
	RMSEA	0.05~0.08 good <0.05 excellent	0.042
	NFI	>0.9	0.926
	IFI	>0.9	0.915

CONCLUSION

Due to the pandemic outbreak, many countries in the world had to lock down their cities and restrict their citizens' daily activities under strict conditions in 2020. Since distance learning at home is a temporary solution, online learning became a trending topic overnight. This research concentrated on how national defense suppliers implementing online character education could have impacts on their employee's learning motivation and perception of integrity. The research findings show that employees of defense suppliers learn to be honest, cultivate good and healthy habits, commit to promises, correct mistakes, be self-confident, do things with heart, are in control of their emotions, treat others with politeness, are helpful and cooperative, know to share, and show consideration to family members as well. From the feedback, all employees of defense suppliers give positive affirmation, presented positive changes after participating in the online character education activity, and appreciate the value of online character education. In the online character education process, teamwork is applied to establish the peer relationship among employees of defense suppliers. Besides, competition, interaction, brainstorming, explanation, questioning, encouragement, and reward systems are presented to enhance the learning motivation to form a climate of teamwork and allow employees of defense suppliers to present a sense of safety and belonging in the activity as well as establish learning motivation and perception of integrity through games, picture books, and experiential activities. Santos Rego et al. (2021) said that teachers should teach online moral education courses in a positive, friendly, and humorous way. In this way, they can develop a trusting interactive mode, and employees will be able

to speak freely (Watz, 2011) also mentioned that in order to achieve good learning results, speaking from your mind and explaining the real situation also serves to enhance students' learning motivation and achievements (Hoedel and Lee, 2016).

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethical Committee of the I-Shou University, Taiwan. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

H-CH performed the initial analyses and revised and approved the submitted version of the manuscript.

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MINI REVIEW
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An Infant's Question on COVID-19 and Music: Should I Attend My Online Classes?

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In the last few months, we all have faced a profound challenge to balance our lives amidst fighting the COVID-19 pandemic. The reactions to this coronavirus pandemic have no doubt affected all aspects of our everyday normalcy as they have called for an extended set of measures that have greatly impacted our social interactions and well-being. During this unprecedented global situation, the pandemic has also taken its toll on education, as schools, universities, and other educational institutions have suspended their programs or moved online to retain educational momentum. Among the programs that tried to adapt to this online model was the early years music education. This mini-review article aims to discuss the framework of online existence for the early years music programs amid the COVID-19 crisis, while considering their benefits and character under these extraordinary circumstances.

Keywords: infants (0 to 24 months), COVID-19, child development, distance learning, music, online behavior

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INTRODUCTION: THE "COVID-19" MUSIC EDUCATION ONLINE TURN

Since the very beginning of the crisis, many people globally, turned to art and more specifically music in order to recharge, to discharge, to balance themselves and to feel supported. The first severe weeks of frustration and adaptation to this new "confined" reality brought a lot of examples of sing-along "balcony stages" and musical moments of relaxation and "distant" socialization in frontline working places like hospitals and caring homes.

Musical creativity, however, was not manifested only through casual everyday expressions or some new, reconsidered clinical approaches (Papatzikis et al., 2020). It continued flourishing in the context of the online education settings, too. Following the secondary and tertiary music education example into turning online (for e.g., see Calderón-Garrido and Gustems-Carnicer, 2021) many already established early-years music education programs tried to successfully accommodate parents/caregivers, "students" and specialist music educator-facilitators in this new online context by devising and offering relevant sessions. The mission and aims of these online sessions were to keep promoting development and further brain stimulation for children whose age ranges between a few months and 5 years (Gruhn, 2005); to propose early forms of sound and rhythm perception (Papatzikis and Papatziki, 2016) among other musical qualities; to offer pre-lexical or early speech communication platforms (Bolduc, 2009; Walton, 2014), but most of all to support and facilitate social interactions, development and bonding (Hallam and Council, 2015). These have always been the goals of early music programs but for the first time they were taking place in a synchronous—sometimes asynchronous too—online educational context approached mostly as "emergency remote" rather than "online" teaching (Hodges et al., 2020).

THE REALITY OF THIS ONLINE TURN

Many early-years music educators embraced this new emergency remote teaching framework and found a platform upon which they continued offering their services and passion for music during the crisis. Moreover, many parents and caregivers happily endorsed the initiative, realizing the potential of extending social interaction as well as the development and shades of normalcy opportunities for their confined infants and toddlers.

Given the circumstances, however, many quite known (McPake et al., 2013) challenges emerged as a result of the virtual interactions. Poor quality of sound; blurred or time-delayed video-stream; overcrowded and pluralistic land- and soundscapes which offensively and randomly merge acoustic and visual stimuli coming simultaneously from the music facilitators and the attendees' immediate surroundings, were some of the elements that started creating problems to the sessions' design and their learning outcomes (Kim, 2020). Many motivation obstacles also seemed to emerge (Martínez-Castilla et al., 2021) when both educators and caregivers realized that non-physical interaction prevails—as of course is to be expected in this online context—producing a fragmented reality of the previously established "communicative musicality" and musical interaction. The fairly calm, structured and controlled physical context of the on-site early-years music education sessions had to be now supplanted by a number of physical and emotional distractors emanating from unavoidable COVID-19 related elements and sources. Ultimately, the mental load needed to participate started becoming more demanding than before (Galea et al., 2020). It skyrocketed for all participants—even the youngest ones—as they embarked to fight screen fatigue, multitasking, the disrupted audio-visual queues, and the false perhaps sense of diminished attentiveness and conscientiousness between the interlocutors; all common mental load denominators found in every context of distance learning (Schoenenberg et al., 2014).

WHY CONTINUE WITH THE ONLINE EARLY-YEARS MUSIC EDUCATION?

Such a non-favorable online reality might eventually bring some quite negative appraisals of the early-years music education initiatives. It might start pushing away interested caregivers who believe that effectiveness in this context solely relies on the music facilitator's extensive skills and immediate interaction with their children; a quality that is not directly available through this mode of session delivery. It might also make some of the caregivers doubt their positive involvement, not having in place anymore the immediate, physical support of the music facilitator. At the same time, considering the physical distance, music educators might start feeling that they do not convey "the message" properly.

To eventually avoid the negative impact the COVID-19 pandemic can bring to this specific educational field, it might be important to highlight some major elements that can still pertain to the online early-years music education context, making it therefore a valuable educational and socialization alternative to this or other similar crises.

Music Socialization Can Still Happen Online

Music leads us to socially connect through parallel and synchronous movement and body entrainment (Merker et al., 2009; Knoblich et al., 2011). Imagine people singing the same song all together. The ensemble of singers becomes a synchronous system of physical movement either via dancing, or moving their hands, or even via moving their body-core. They all start feeling the same rhythm. Studies related to the bio-mechanic character of music's impact on humans have shown that many of our body and brain parts manage to perfectly synchronize (Müller and Lindenberger, 2011; Greenberg et al., 2021). Such a synchronization makes us feel socially present and active (Wiltermuth and Heath, 2009; Good et al., 2017) while also help us ease pain, increase its threshold and "fight" psychological discomfort (Weinstein et al., 2016). Considering (a) that a synchronous music movement and body entrainment can indeed take place at a certain extend during the online interaction, as well as that (b) studies on online synchronous interaction have suggested that social presence can be maintained in this context (Cobb, 2009) we understand that perhaps a far-fetched, yet possible form of socialization can still emerge and sustained through the particular mode of delivery.

Mentally, Online Sessions May Be Better Than No Sessions at All

Research at a sociobiological level has repeatedly shown that musical interaction promotes social connectionism (Hove and Risen, 2009; Chanda and Levitin, 2013) and social adaptation (Tarr et al., 2014) by helping our bodies adjust their reaction to their environment. More specifically, it has been found that social singing can decrease the levels of cortisol (a stress biomarker), it can increase the oxytocin levels in our bodies (a biomarker of social bonding), while it can also increase the levels of β-endorphins (a biomarker connected to reward and pain thresholds) (Kreutz, 2014; Fancourt et al., 2016; Weinstein et al., 2016). Moreover, neuroscientific studies (Fasano et al., 2019; Klepzig et al., 2019; Martínez-Molina et al., 2019; Nemati et al., 2019; Shany et al., 2019; Greenberg et al., 2021) have also suggested that (social) music engagement may well-increase our brain activation, the feeling of well-being as well as the levels of our focus and attention. Considering the severe impact the COVID-19 confinement measures may have on our mental health (Holt-Lunstad et al., 2010; Galea et al., 2020) as well as the toll a potentially socially deprived environment might take on infants' and toddlers' brain (Innocenti, 2007), it seems important to continue offering these sessions even if not in their best available form.

The Online Reality May Benefit the Infant-Parent Dyad Bonding

Early-years music sessions are greatly valued from many parents and caregivers because they offer an extensive platform

for early social interactions. They promote parent and child learning while establishing connections within and between different families (Rodriguez, 2019). Children in the early music education context learn to perceive communication via a triadic system (i.e., self-parent- "third party") while they create social partnerships of equal and cooperative members through entrainment, social/emotional referencing, joint attention and joint action (Ilari, 2016). Nevertheless, in this new online context, it is quite evident—from its technical requirements and framework (Qasmi et al., 2021)—that while entrainment and joint action can somewhat be achieved for the triadic system, this cannot easily happen for social/emotional referencing and joint attention. Emotional referencing and alignment with a third party, outside of the parent-infant dyad, seems very difficult to get achieved for technical reasons. The same applies to joint attention; especially for the younger participants who may not be able to perceive the dynamics and properties of the online communication context. As a result, children may be found more distracted, energy drained, or even non-attracted at all by the specific learning process. Despite these challenges, however, their realization could illuminate a positive path to follow and benefit from. The infant-parent dyad could enhance their interactions repertoire and provide more time and space for the dyadic system to flourish as proven in previous research (Niedzwiecka et al., 2018; Corkin et al., 2021). Additionally, more opportunities may arise for the parents to explore and refine their own involvement in musical and communication terms (i.e., invest more into trying signing with their children; experimenting and furthering techniques of musical interaction already known from previous physical sessions etc.).

DISCUSSION

There is no doubt that the online (a)synchronous early-years music engagement synthesizes a demanding educational environment. This environment showcases a great list of both negative and positive points to consider. It is a new delivery mode introducing unchartered waters for both parents and educators. Admittedly, this mode of delivery can in principle be very helpful. However, it came unfortunately in use at a difficult time, amidst a pandemic, where emotions, practices and results are greatly tested and stretched.

A first reaction to this abrupt online turn would be to consider that families should take away with them whatever they can handle and are happy with. Therefore, it might be helpful to remind them that it does not have to be all about the infants and toddlers engaging with the facilitators via the screen. Parents should look for engaging more actively with their infants, appraising even more so the involvement of the "online" facilitator as guidance for them rather their children. Afterall, the parents should be the major catalysts in the educational and developmental process in the early years; be it either online or offline. Parents might even need to guide professional practitioners to more efficient and reliable communication techniques in this demanding context. In the end, more field research is definitely needed to start mapping and translating this complex yet promising for current and future applications online mode of early-years music engagement. The discussion interconnecting music, education, mental health and COVID-19 may have come here to stay for a while longer as relevant research shows (Mastnak, 2020) and we therefore owe to offer to the youngest ones a well-informed answer on whether or not (and how) to better attend online early years music education classes.

AUTHOR CONTRIBUTIONS

EP conceived, wrote, and edited the manuscript.

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BRIEF RESEARCH REPORT
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A Study on the Relationship Between Learning Motivation and Learning Effectiveness of Personnel Based on Innovation Capability

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Under the impact of intense competition in the face of globalization, the enhancement of the quality of human capital has become the primary goal for enterprises reinforcing the competitiveness as well as the power for constant growth and profit creation. It is the well-known norm of enterprises as well as the standard of human resource management; the enhancement of capability is the key activity of enterprises as well as the common task for modern people. Work and learning run parallel in order to cope with the rapid accumulation and change of knowledge; furthermore, in addition to enterprises providing opportunities for education, employees are requested to constantly update their training. Employees in the high-tech industry in Shanxi Province, as the research objects, were distributed 500 copies of one standard questionnaire, where 384 valid copies were retrieved, with a retrieval rate of 77%. The research results illustrate significantly positive effects of (1) learning motivation on innovation capability, (2) innovation capability on learning effectiveness, and (3) learning motivation on learning effectiveness. According to the results, providing the high-tech industry with more effective education curriculum planning and arrangement is expected.

Keywords: high-tech industry, innovation capability, learning motivation, learning effectiveness, structural equation modeling

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INTRODUCTION

Knowledge-based economy is, without a doubt, the most famous study in the twenty first century. Under the impact of intense competition in the face of globalization, the enhancement of the quality of human capital has become the primary goal for enterprises reinforcing the competitiveness as well as the power for constant growth and profit creation. It has become the well-known norm and the standard of human resource management for enterprises. Education, therefore, has become the emphasized task of enterprises. Merely the constant promotion of employees' productivity and enhancement of employees' professional skills could maintain employees' contribution to the organizations. Based on the investment in human capital, most enterprises would strongly prefer to invest in education curriculum and activity. However, it is speculated whether employees could have the best educational effectiveness in return for enterprises' investment in education, whether employees are willing to accept education when enterprises provide educational opportunity, and whether employees could directly apply the learning results in relation to work performance after

receiving the education. These are the questions concerned by enterprises investing resources in educational opportunity and expecting to enhance competitiveness with improvement.

From previous employment experience, the decision is mainly based on educational background. This is exactly why citizens pursue higher education blindly. They do not value the actual ability to develop skills. Nowadays the working environment has changed into valuing employee's ability gradually (Dul and Ceylan, 2011; Rothes et al., 2017). The enhancement of capability has become the key activity of enterprises as well as the common task for modern people. To cope with the rapid accumulation and change of knowledge, work and learning run parallel; furthermore, enterprises, in addition to providing opportunities for education, request that employees engage in constant training. "Motivation" is the power of behavior, and learning is no exception. Indeed, successful learning activities promote strong motivation; learning activities without motivation tend not to convey the expected effect. Learning motivation is the most important driving force of learning behavior, as it facilitates learners to actively engage with the learning content. Moreover, it guides learners to grasp the learning direction as well as positively and continuously engage in learning activity to complete tasks and achieve the preset learning objectives. Past research pointed out learning motivation and learning behavior as key factors in learning effectiveness; education could induce learners' innovation capability and enhance educational effectiveness. When the correlations were discovered, it could provide effective assistance for human resource managers preceding education curriculum design, execution, and development (Brinkman, 2010; Brettel and Cleven, 2011). Therefore, there are a lot of discussions about training results (Wong and Wong, 2021). Many researchers can discuss the evaluation methods and affecting factors of training results from different perspectives (Prieto, 2012; Rothes et al., 2017). Besides, there are many discussions about creativity (Shao et al., 2019; Smadi and Raman, 2020). During the discussion of training results, learning motivation and learning behavior are often mentioned, however, the connection between employees' learning motivation, creativity, and training results is rare.

As a result, the relationship between learning motivation and learning effectiveness of personnel in the high-tech industry, based on innovation capability, is discussed in this study, expecting to provide the high-tech industry with more effective education curriculum planning and arrangement.

LITERATURE REVIEW AND HYPOTHESIS

Aiming at adults' learning motivation and innovative performance, Cheng and Yi (2018) conducted empirical research and discovered remarkably positive relations between learning motivation and innovative performance. In the discussion of effects of learning climate and knowledge sharing on employees' knowledge transfer performance and innovative behavior, Nazir et al. (2018) carried out empirical research with learning motivation as the moderator and discovered notably positive effects of learning motivation on knowledge sharing and significantly positive relations between knowledge sharing and employees' innovative behavior. Sung et al. (2019) studied the correlations between students' learning motivation and creativity and discovered that learning motivation (intrinsic motivation and extrinsic motivation) could effectively predict creativity. The following hypothesis is therefore proposed in this study.

H1: Learning motivation reveals significantly positive effects on innovation capability.

Wang et al. (2018) revealed that engineering professionals with slightly high "innovation capability" would reinforce the "contextual performance." In addition, Akram et al. (2018) pointed out innovation capability as the most critical factor in excellent innovation performance because of the characteristics of new products with a shorter life cycle and higher introduction in the market; therefore, employees in a company with better innovation capability would demonstrate higher work performance. Equally important, Mishra and Pandey (2019) considered that an individual with higher understanding and cognition of the environment and others could mutually deliver ample knowledge and information to further induce more innovation, enhance intelligent capital, and assist in work performance. In this case, the following hypothesis is proposed in this study.

H2: Innovation capability shows remarkably positive effects on learning effectiveness.

Similarly, Ho and Fu (2018) considered that effective connection of business personnel's core competencies and learning motivation could enhance education effectiveness, especially the relationship between "intrinsic motivation" and "results level." Furthermore, Bednall et al. (2018) discussed the effects of the internal locus of control, self-efficacy, organizational commitment, and perceived interpersonal justice in remedial education on learning motivation and learning effectiveness and detected positive effects of learning motivation on educational reaction and learning performance. Roibu et al. (2019) studied the correlations among learning motivation, educational effectiveness, and work performance of employees in the high-tech industry and discovered that most employees in the high-tech industry participated in education due to intrinsic motivation, and behavior level in educational competency appeared to show better effectiveness. Accordingly, the following hypothesis is proposed in this study.

H3: Learning motivation presents notably positive effects on learning effectiveness.

METHODOLOGY

Operational Definition and Measurement of Variable

Learning Motivation

Referring to Qi et al. (2019), the conceptual structure of participation in learning and dropping out based on the introduction of human resource development are revised for this

study. The operational definitions for adults' learning motivation are explained below.

1. Career progression: It could benefit career development, the enhancement of functional competency for work, and promotion.
2. Social relations: Making friends and expanding interpersonal relations and social network.
3. External expectation: Participating in learning activity due to the requirement and expectation of supervisors or teachers in order to conform to others' requirements, obeying the request and encouragement of supervisors or teachers, and being influenced by others' participation in education.
4. Fun to seek knowledge: To enhance professional growth and cognitive interest as well as broaden horizons with learning.
5. Self-fulfillment: Pursuing personal development to enhance adaptation and self-understanding.

Innovation Capability

Referring to Jia et al. (2019), individual innovative behavior is divided into innovative idea generation and innovative idea execution in this study.

1. Innovative idea generation: Members perceive problems and come up with solutions.
2. Innovative idea execution: Members seek for supporters that agree with the new ideas and attempt to establish supporter alliance for the ideas and eventually build an innovative model with such ideas.

Learning Effectiveness

Referring to Le and Lei (2019), learning outcome is divided into cognitive outcome, skill-based outcome, and emotional outcome in this study.

1. Cognitive outcome: Cognitive outcome is decided by trainees' familiarity with the principles, facts, skills, programs, or processes emphasized in the education curriculum to measure the knowledge learned in the education curriculum. Traditionally, the cognitive outcome is evaluated with a paper-and-pencil test.
2. Skill-based outcome: Skill-based outcome is used for evaluating state-of-the-art, motor skills, or behavioral outcome, including skill acquisition or learning; and, the application of such skills to work (learning transfer) is mostly measured with field observation.
3. Emotional outcome: Emotional outcome contains attitude and motivation, as the measurement aiming at trainees' responses to and satisfaction with educational planning, educational equipment, and educational content to understand the factors in the success of education and the obstacles to education. A survey is generally applied to collect relevant information for evaluating trainees' emotional outcome.

Research Object

Employees in the high-tech industry in Shanxi Province are selected as the research objects. A total of 500 copies of one standard questionnaire are distributed and 384 valid copies are retrieved, with a retrieval rate of 77%.

TABLE 1 | Overall linear structural model analysis result.

Evaluation item	Parameter/evaluation standard	Result
Internal fit	Learning motivation → innovation capability	0.32**
	Innovation capability → learning effectiveness	0.29**
	Learning motivation → learning effectiveness	0.37**

**$p < 0.01$.

Research Method

Structural equation modeling (SEM) is used for testing the research structure in this study. Structural equation modeling is divided into a confirmative factor analysis (CFA) model, which is also called the measurement model in structural equation modeling, to connect manifest variables with latent variables, and a structural model (also named latent variable modeling), which is mainly established among latent variables and is similar to path analysis. The difference lies in manifest variables being used for path analysis, but latent variables for the structural model.

The structural model is complementary to the measurement model; the structural model requires the measurement model for considering variable measurement error, while the measurement model requires the structural model for understanding the cause-and-effect relationship among latent variables. Structural equation modeling achieves the mutual needs of both models and simultaneously covers the measurement model and structural model, allowing measurement error in variables, as in the measurement model, allowing error (or residual) in equations, and estimating the cause-and-effect relationship among latent variables, as in the structural model.

The model fit can be evaluated from preliminary fit criteria, overall model fit, and fit of internal structure of model.

Test of Reliability and Validity Analysis

The reliability of dimensions in this study reaches 0.7, revealing high reliability of such dimensions. The construct validity of the scale in this study is analyzed with confirmative factor analysis. **Table 1** shows good convergent validity and construct validity of the scale in this study. The standardized regression coefficients of indicators of latent dimensions achieve significance, between 0.5 and 0.95, and the measurement error does not appear negative meaning that it is acceptable.

ANALYSIS RESULT

Correlation Analysis

The correlation analysis results present remarkable correlations among learning motivation, innovation capability, and learning effectiveness. Such results reveal the possibility of multicollinearity among research dimensions. Nested model analysis could be used for solving the problem. The notable correlations among research dimensions confirm the research hypotheses.

TABLE 2 | Nested model analysis.

Model	χ^2	$\Delta\chi^2$	GFI	CFI	RMSEA
Theoretical model	241.37		0.974	0.962	0.04
Model 1: Hypothesis test	244.63	3.26*	0.974	0.962	0.04
Model 2: Hypothesis test	248.74	4.11*	0.974	0.962	0.04
Model 3: Hypothesis test	253.57	4.83*	0.974	0.962	0.04

*$p < 0.05$.

Overall Model Discussion

In terms of overall model fit, the overall model fit standards $\chi^2/df = 1.587$, smaller than the standard 3, and RMR = 0.006 reveal the proper results of χ^2/df and RMR. Furthermore, the chi-square value is sensitive to sample size so it is not suitable for directly judging the fit. However, the overall model fit standards GFI = 0.974 and AGFI = 0.938 are higher than the standard 0.9 (the closer GFI and AGFI are to 1, the better the model fit) so the model presents better goodness-of-fit indices.

Research Hypothesis Discussion

The structural equation modeling testing results (**Table 1**) show the effects of "learning motivation" and "innovation capability" on "learning effectiveness." Aiming at the above objectives, the influence is explained.

1. The direct and positive effect of "learning motivation" → "innovation capability" is 0.32**, so H1 is supported.
2. The direct and positive effect of "innovation capability" → "learning effectiveness" is 0.29**, so H2 is supported.
3. The direct and positive effect of "learning motivation" → "learning effectiveness" is 0.37**, so H3 is supported.

As we used the nested model to test hypotheses, the chi-square test is used because each nested model presents the difference of a degree of freedom; in this case, when the difference between the chi-square value of the nested model and the chi-square value achieves significance, the setting of path coefficient = 0 is significant. The research results reveal the significance of the model. The nested model analysis results are shown in **Table 2**.

DISCUSSION

In the structural composition analysis of employees in the high-tech industry, educational courses aim to impart management-related knowledge to employees in the field and cultivate their leadership ability. The curriculum design stresses on the combination of theory and practice so that employees in the high-tech industry, after learning, can apply the learned competencies to practical work. For this reason, employees in the high-tech industry are educated to actively and positively engage in relevant courses and clarify the learned competencies to promote work quality and work efficiency and effectiveness. As a result, employees in the high-tech industry should modify their learning attitude, create learning strategies, cultivate good learning habits, and apply learned knowledge and skills to the workplace for generating and implementing innovative ideas to construct personal high learning effectiveness. Education institutions in the high-tech industry could revise the education curriculum, to talent education and other on-the-job training, based on innovation capability to reinforce learning motivation, facilitate positive learning behavior, and further induce innovation capability to promote learning effectiveness. In order to strengthen the learning behavior of employees in the high-tech industry, the innovation capability should be reinforced to further enhance learning effectiveness. Such innovations rely on the establishment of a counseling mechanism to guide systematic learning and learning situations for enhancing learning performance and learning effectiveness. Blamiresa and Peterso (2014) believed that junior staff and middle managers are the foundations in a department. Therefore, it is necessary to reinforce their learning behavior and creativity to improve their training results. Han et al. (2013) thought this depended on establishing a counseling system. It can guide them to learn systematically and form a suitable learning environment to enhance training grades and results (Kuoa et al., 2017).

CONCLUSION

The research findings show that innovation capability is the major factor in the learning motivation of employees in the high-tech industry that enhances learning effectiveness, where innovation capability is the best measurement variable of learning effectiveness. Innovation capability originates from the change in learning behavior that good learning attitude, effective learning strategy, and cultivation of good learning habits can induce individual innovation capability and enhance personal learning effectiveness. The motivation of employees in the high-tech industry to participate in the talent education curriculum relies on interest in pursuing knowledge, career progression, and self-fulfillment. For this reason, talent education institutions, when designing and planning an education curriculum, should take employees' interests and needs into account and understand their interests and needs through surveys or discussions. In order to secure a higher rate of participation in an education curriculum, taking such factors into account and incorporating them into the education curriculum would be the most effective way. Consequently, the reinforcement of learners' innovation capability in the curriculum design is the most effective way to enhance learning effectiveness. How to have employees in the high-tech industry apply the learned management theory to practical work with the combination of theory and practice should be a major task for those concerned with planning talent education curriculum design. The practicable methods contain personal project reports of employees in the high-tech industry, i.e., applying management theories, concepts, tools, and tactics learned in the training to the current work, or an action plan checklist, i.e., applying the learned management theories,

concepts, tools, and tactics to improve work performance, and setting goals with execution to prove what has been learned. Shriki (2013) indicated that employees working in the high-tech industry can improve their training results through creativity, and creativity is an important impact factor to improve their learning motivation and training results (Lee and Yang, 2015). These research results should be widely promoted and applied. Therefore, the high-tech industry should also develop educational training courses while doing personnel training. This would be helpful to reinforce the learning motivation of employees in the high-tech industry and promote positive learning behaviors. It can also inspire creativity to enhance training results.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the Ethics Committee of Shanxi Datong University. Written informed consent was obtained from all the participants.

AUTHOR CONTRIBUTIONS

GZ and CC revised and approved the submitted version of the manuscript. GZ performed the initial analyses and wrote the manuscript. CC assisted in the data analysis. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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Effects of the Application of Virtual Reality to Experiential Education on Self-Efficacy and Learning Motivation of Social Workers

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To enhance the human resources required for national development to cope with the change, countries in the world have positively invested in education, as national education in the future is necessary to cultivate new-generation citizens with new traits and abilities to cope with the possible impacts and challenges in the new century. For this reason, the education reform wave sweeps many countries. The experiential learning model in experiential education nowadays leads profit and non-profit organizations in the business community, education, and social worker groups to the alternative education trend. Various experiential learning curricula are therefore spread. Taking social workers in southern Taiwan as the research objects, a total of 227 social workers are preceded the 15-week (3 h per week for a total of 45 h) experimental research with the application of virtual reality to experiential education. The research results summarize that (1) experiential education with virtual reality would affect self-efficacy, (2) experiential education with virtual reality would affect learning motivation, and (3) self-efficacy reveals remarkably positive effects on learning motivation. According to the results, it is expected to increase the interaction among the social workers through the learning activity and internalize the experience in the practical learning process of communication, problem solving, and extrinsic interaction for the application to the work to achieve a better life.

Keywords: virtual reality, experiential education, social worker, self-efficacy, learning motivation

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INTRODUCTION

In the 21st century, people are in the era with rich information, advanced technology, rapidly changing society, convenient life, and close international relationship, but fierce international competition. To enhance the human resources required for national development to cope with such changes, countries in the world have positively made a huge investment in education as it is necessary for future national education to cultivate new-generation citizens with the new traits and abilities to cope with the possible impacts and challenges in the new century. As a result, the education reform wave sweeps many countries. Experiential education activity combines the principles and methods of natural education, field trip, and experiential courses and is promoted to schools, social education, medical care, leisure, and education guidance in legal affairs units (Chapman et al., 1992). The essence of education could be understood through the

development background and process. Experiential education provides purposive active learning opportunities through real situations to strengthen the individual growth and the interactive operation and response-ability of organizations through individual and group interactive learning (Kwon, 2019). Each person plays a different role, as important as a screw of a machine, in the experiential education process. Team training could rapidly cultivate the team spirit of participants and constantly produce peak experience of participants in learning so that learners could fast grasp the learning objectives and members could receive different learning from the past in the future and life. The experiential learning model in experiential education nowadays could lead profit and non-profit organizations in the business community, education, and social worker groups to the trend of alternative education. In this case, various experiential learning curricula are broadly spread. Leonard (1990) stated that the experiential education activity is explained with different terms, such as exploratory education and adventure education. Experiential education is getting started domestically in the past few years. The above-mentioned experiential education covers excitement, uncertainty, reality, perceived risk, effort, and mutual effect with the natural environment so that the enterprises change or adjust the past taught courses in the personnel training into experiential education curricula to increase the fun. In this case, the effects of the application of virtual reality to experiential education on the self-efficacy and learning motivation of social workers are discussed in this study, expecting to increase the interaction among the social workers through such learning activity and internalize the experience in the practical learning process of communication, problem solving, and extrinsic interaction to the work to achieve the better life.

LITERATURE REVIEW AND HYPOTHESIS

Literature

Huang and Liaw (2018) mentioned the value of experiential education, such as learning by doing, reflection, teamwork, autonomous challenge, problem solving, the establishment of trust, and listening and expression, and discovered that after integrating experiential education into curricula, the problem-solving ability of students, team cohesiveness, extrinsic interaction, frustration tolerance, character education, and self-concept would be improved. Breunig (2019) explained experiential education as the learning method integrating explored events, issues, or tasks into the activities to guide the experience, perception, insight, comprehension, and application of the participants. Experiential education created learning situations and provided self-experience and team experience opportunities for people to find out personal ability, value, enthusiasm, and responsibility. Ye et al. (2019) indicated that stressing the learning process of students in experiential education, maintaining a good teacher-student relationship with interaction and positive feedback, and carefully observing the responses of students with proper guidance to cultivate active problem thinking behavior of students could improve the self-efficacy of the students and team cohesiveness after the end of the courses. The following hypothesis is therefore proposed in this study.

Chang et al. (2018) mentioned the significant effect of participation in experiential education on the enhancement of self-concept and self-fulfillment to promote the self-concept and self-fulfillment with continuous learning motivation. Falloon (2019) considered that experiential education could enhance the learning motivation and learning effectiveness of general students. Zheng et al. (2018) regarded the objective of experiential education as allowing students to practice, experiencing, and reflecting the meaning of life through the curriculum. The activity curriculum was the integrated curriculum based on the learning motivation of the students; in experiential education, the activities were more than lectures, with certain flexibility in the materials and process, emphasizing the individual differences, problem solving centered, and aiming to cultivate the problem-solving ability of the students. Accordingly, the following hypothesis is proposed in this study.

Cheng and Tsai (2019) pointed out the function of self-efficacy in the individual decision of learning motivation to appear significant effects on the learning process and effect. People with higher self-efficacy presented more frequent self-judgment behavior and better self-learning motivation. Chang et al. (2019) revealed that pupils with stronger self-efficacy would enhance the individual self-confidence through the feedback of learning experience, self-evaluation process, and learning outcome on self-efficacy to present higher learning motivation. Hwang et al. (2019) mentioned that some studies pointed out the remarkably positive correlations between self-efficacy and learning motivation that the higher self-efficacy, the higher learning motivation. The following hypothesis is further proposed in this study.

Research Hypothesis

According to the above literature, the following hypotheses are proposed in this study.

H1: Experiential education with virtual reality would affect self-efficacy.
H2: Experiential education with virtual reality would affect the motivation to learn.
H3: Self-efficacy shows notably positive effects on the motivation to learn.

METHODOLOGY

Measurement of Research Variable

Experiential Education With Virtual Reality

Li (2014) mentioned that experiential education should present several important dimensions of "challenge," "team," and "self-reflection." They are applied to this study.

1. Challenge: Experiential education activity should present challenges and fun to attract the participation of members.
2. Team: Experiential education is preceded by teams, and the members in the activity must be participants who could engage in the activity according to their ability and needs.

3. Self-reflection: After experiencing a series of designed activities, the members must precede reflection, digest, and absorb the physical, psychological, and spiritual perception and experience, recombine, and internalize into meaningful gains for themselves, and change the behavior.

Self-Efficacy

Referring to Lei et al. (2019), the self-efficacy in this study contains three dimensions.

1. Cognitive influence: People with higher self-efficacy present higher ambition and longer points of view are more thoughtful, and more willing to accept the difficult challenges and would firmly devote themselves to those challenges.
2. Motivational influence: The belief in self-efficacy to be able to complete certain affairs would affect people's goal setting, action strategy, willingness to make efforts, persistence to face a challenge, and degree of recovery from frustration.
3. Affective influence: The bearable pressure, when people encounter dilemmas or threats, is mostly decided by the degree of their consideration of completing the affair.

Learning Motivation

According to the research of Chen et al. (2019), learning motivation is divided into two dimensions in this study.

1. Intrinsic orientation: Including favor of challenging courses, regarding learning as interest and hobby, considering that learning could expand vision, actively learning new courses, and learning for developing self-potential and fulfilling ideal.
2. Extrinsic orientation: Covering learning for receiving others' affirmation, obtaining better performance, passing examinations or evaluation, showing off to others, competing with classmates, receiving appreciation and attention from elders or the opposite sex, avoiding punishment and scold, and preventing from the shame of failure.

Research Subject

Taking social workers in southern Taiwan as the empirical objects, a total of 227 social workers are preceded the experimental research on experiential education with virtual reality. After deducting invalid and incomplete copies of the questionnaire, 216 valid copies are retrieved, with a retrieval rate of 95%.

Analysis Method

Both SPSS 22.0 and AMOS 20.0 (IBM Corp., NY, USA) are used for the analysis. The structural model in the structural equation model (SEM) is applied to confirm the effects of experiential education with virtual reality, self-efficacy, and learning motivation and test the hypotheses.

Experimental Design and Process

This study aimed to discuss the effect of the virtual reality applied experiential education on the self-efficacy and motivation to learn of the social workers, with experimental design. The experiential education with virtual reality is preceded with experiments, and the self-efficacy scale and motivation to learn scale are used as the testing tools for the 24-week (2 h per week for a total of 48 h) experimental research.

Groups, such as the experimental group and control group, are the independent variables, and self-efficacy and motivation to learn are the dependent variables in this study.

TABLE 1 | Correlation analysis.

Research dimension	α	Experiential education with virtual reality	Self-efficacy	Learning motivation
Experiential education with virtual reality	0.84			
Self-efficacy	0.89	0.33**		
Learning motivation	0.91	0.38**	0.31**	

*Note: **$p < 0.01$.*

Independent Variable

The independent variables, the experimental group, are preceded the experiment. The experimental group applies "experiential education with virtual reality."

Dependent Variable

Dependent variables in this study refer to the post-test performance of the subjects on the "self-efficacy scale" and "motivation to learn scale."

RESULT OF THE STUDY

Factor Analysis

The experiential education with virtual reality scale, after factor analysis, extracted three factors of "challenge" (eigenvalue = 2.841, α = 0.86), "team" (eigenvalue = 1.975, α = 0.82), and "self-reflection" (eigenvalue = 1.637, α = 0.85). The cumulative covariance explained achieves 72.438%. The self-efficacy scale, after factor analysis, extracted three factors of "cognitive influence" (eigenvalue = 2.664, α = 0.87), "motivational influence" (eigenvalue = 2.136, α = 0.88), and "affective influence" (eigenvalue = 1.845, α = 0.90). The cumulative covariance explained reaches 77.253%. The learning motivation scale, after factor analysis, is extracted two factors of "intrinsic orientation" (eigenvalue=3.514, α =0.91) and "extrinsic orientation" (eigenvalue=3.193, α =0.92). The cumulative covariance explained achieves 81.624%.

Correlation Analysis

From **Table 1**, experiential education with virtual reality, self-efficacy, and learning motivation show significant correlations, revealing that H1, H2, and H3 are preliminarily supported.

Evaluation Indicators of SEM

The model fit could be evaluated from the preliminary fit criteria, overall model fit, and fit of the internal structure of the model. The research data are organized as below.

From the complete model analysis result, three dimensions of experiential education with virtual reality (challenge, team, and self-reflection) could remarkably explain experiential education

with virtual reality ($t > 1.96$, $p < 0.05$), three dimensions of self-efficacy (cognitive influence, motivational influence, and affective influence) could notably explain the self-efficacy ($t > 1.96$, $p < 0.05$), and two dimensions of learning motivation could significantly explain the learning motivation ($t > 1.96, p < 0.05$). Apparently, the overall model in this study presents good preliminary fit criteria.

In terms of internal fit, experiential education with virtual reality reveals positive and remarkable correlations with self-efficacy (0.392, $p < 0.01$), self-efficacy appears positive and notable correlations with learning motivation (0.367, $p < 0.01$), and experiential education with virtual reality shows positive and significant correlations with learning motivation (0.433, $p < 0.01$) that H1, H2, and H3 are supported.

Regarding overall model fit, the overall model fit standards $\chi^2/df = 1.721$, smaller than the standard 3, and root mean squared residual (RMR) = 0.004, revealing the proper results of χ^2/df and RMR. Furthermore, chi-square is sensitive to the sample size that it is not suitable for directly judging the fit. However, the overall model fit standards goodness of fit index (GFI) = 0.968 and adjusted goodness of fit index (AGFI) = 0.917, higher than the standard 0.9 (the closer GFI and AGFI to 1 revealing the better model fit) that this model presents better fit indices. The hypothesis test results are shown in **Table 2**.

Figure 1 shows the overall research result. The path coefficients achieving the significance are denoted with solid lines, while those without reaching the significance are shown with dotted lines. The path coefficients of variables achieve significance, revealing the convergent validity of such path coefficients. It is the basic requirement for model analysis. Accordingly, the model fit is verified, i.e., the research model conforming to the theory with validity.

TABLE 2 | Hypothesis test.

Research hypothesis	Correlation	Empirical result	P	Result
H1	+	0.392	0.00	Supported
H2	+	0.367	0.00	Supported
H3	+	0.433	0.00	Supported

DISCUSSION

The idea of applying virtual reality to an experiential learning model is to organize and induce specific and meaningful environmental experiences or events through the inner reflection and thinking of social workers to eventually generate an abstract idea or model. When there is a similar experience in future events and environment, the social workers, with an individual will, could select to apply the ideas from past experiences and re-establish and learn new concepts. The research results are similar to the research results of Glass and Benshoff (2002), and Sibthorp and Arthur-Banning (2004). Motivation to learn is the inner mental process of learners appearing drive on the participated learning activities and continuously preceding the learning activities and allows learners to approach the goals set by instructors (Brown, 2004). The stronger motivation to learn would naturally result in better learning effectiveness. When someone tries to learn, environment, behavior, and the mutual interaction between individuals will all take part in affecting the outcome (Paisley et al., 2008; Thomas, 2008) and, aiming at specific tasks or curricula, the subjective evaluation of the ability to complete tasks (Paisley et al., 2008). For this reason, the self-efficacy of the learners would affect the problem-solving motivation and ability in the learning activities; different curriculum designs would be planned according to the self-efficacy of the learners. Nevertheless, even experienced teachers might appear blind spots in the actual teaching process. The application of virtual reality to experiential learning could help teachers understand the learning state of the social workers from the feedback and the opinions and learning experience of

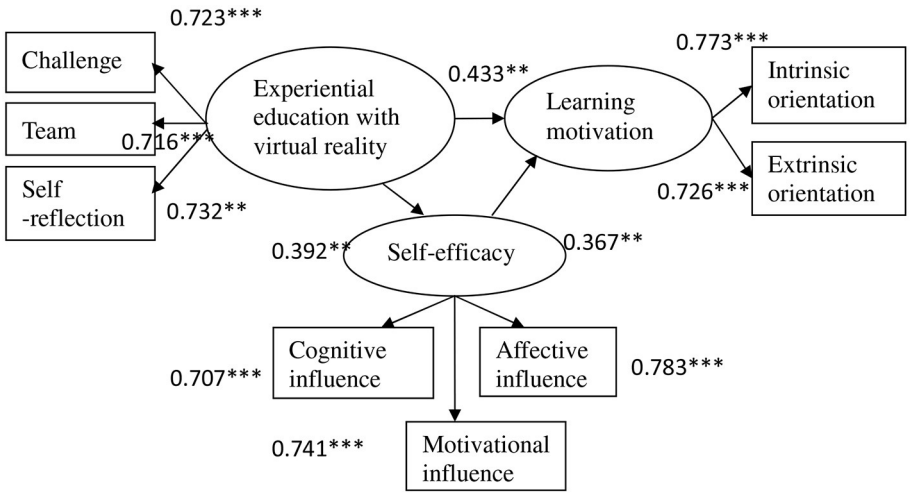

FIGURE 1 | The path coefficients analysis. $^{**}p < 0.01$ and $^{***}p < 0.001$.

the participatory social workers on the worksheets. Besides, the guidance and teaching effect could be strengthened aiming at an individual and the other special situations. It could achieve the effect of two-way communication and assist teachers in adjusting and correcting the curricula or teaching styles.

The teachers with rich experiences might appear blind spots in the actual teaching process.

CONCLUSION

An experiential learning model introducing experience into personal learning is now broadly applied to schools, society, enterprises, and psychological counseling. With the factor of self-challenge, it could be applied to youth recovery, the life effectiveness of college athletes, problem-solving ability, knowledge promotion of the teachers, learning abilities of pupils, corporate team development, and physical image to achieve the estimated effectiveness. The application of virtual reality to experiential education is therefore selected for this study. The research results show that the social workers with higher self-efficacy in the application of virtual reality to experiential education would enhance the learning motivation. The research results are similar to those of McKenzie (2003), Goldenberg and Pronsolino (2008), and Sibthorp et al. (2011). Possibly because the application of virtual reality to experiential education is more flexible and the operation process is relaxing that the social workers could learn in a relaxed mood. In this case, higher self-efficacy would enhance the learning motivation.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the Ethics Committee of the University of Southern California, with written informed consent being obtained from the participant. The participant was asked to read and approve the ethical consent form before participating in the present study. The participant was also asked to follow the guidelines in the form in the research. The research protocol was approved by the Ethical Committee of the University of Southern California, CA, USA.

AUTHOR CONTRIBUTIONS

SH revised and approved the submitted version of the manuscript.

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frontiers in Psychology

BRIEF RESEARCH REPORT
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Comparison of Students' and Teachers' Opinions Toward Digital Citizenship Education

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The impact of the COVID-19 pandemic has led to the temporary interruption of educational activities in the classroom. Digitalization of the classrooms emerged as a need following that process. The objective of this study is to compare the digital citizenship levels of teacher candidates studying in the last year at the departments of classroom teaching and primary school classroom teachers and to reveal their needs. A total of 38 primary school classroom teachers and 27 classroom teacher candidates in the last year of teaching programs in North Cyprus participated in the research. This descriptive study was designed as a case study, which is a qualitative research approach. The data of the study were gathered within the frame of a grounded theory coding process and were analyzed through descriptive analysis, content analysis and the constant comparison technique. The digital citizenship levels of the classroom teachers and teacher candidates were analyzed according to the sub-dimensions of digital citizenship. As a result of the research, it was found that the digital citizenship sub-dimension scores of the classroom teachers were higher than the teacher candidates and that the teacher candidates needed digital citizenship education.

Keywords: communication in COVID-19, digital citizenship, digital citizenship education, digitalization, digital transformation

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INTRODUCTION

As a result of the continuingly developing modern technologies, distance has become unimportant, which has led to a fundamental transformation of human life (Davies, 2011). This change has triggered human curiosity toward technology and the Internet and the levels of interest and addition to the Internet are continually increasing. Furthermore, it is now virtually compulsory to use the Internet in modern society (Akkoyunlu and Yılmaz, 2005). New generations are exhibiting significant differences to previous generations in terms of technology use. However, in the last decade alone, the regular access and use of digital technology have increased in all age groups (Rideout, 2017).

Parallel to the increase in use of the Internet, the development of mobile devices, information communication technologies and cloud technologies have also had a considerable impact. In particular, desktop computers, laptops, smart phones, and tablets, and other mobile devices allow humans to integrate the digital world into their daily lives and they can now easily contact their friends *via* online media. Also, people have started to use mobile devices in schools or other

environments for educational purposes as the technology can be used anywhere at any time. The use of digital devices during the ongoing COVID-19 pandemic that has impacted the world has also become compulsory and many people around the world are using them to meet their needs, such as for shopping, communication, and education (Akcıl and Bastas, 2021). It is observed that individuals are taking measures such as isolating themselves or protecting social distance (Ranchordas, 2020). In the studies conducted by Yolal and Kozak (2008), it was found that current users started to meet their needs through electronic environments and this situation highlighted the concept of digital life. Another factor is that individuals are able to transfer their knowledge to each other by using online media, use all digital applications provided by governments and access news from around the world immediately. In other words, people have begun to meet their needs through the digital media such as e-shopping, e-government, e-books, e-libraries, e-Pulse (e-Nabiz), e-banking, etc.

As a result of the impact of technological developments on people's daily routines, the number of technology users continues to increase. Through these developments, technology has become fundamentally integrated into people's lives and has added a new dimension to human relations and communication, such that a new societal concept has emerged. This concept is called the network society and the members of this society are called digital citizens (Castells, 2000). The digital citizen uses their own communication possibilities and their own knowledge while engaging in critical thinking and understanding the ethical causes of the behaviors they face and exhibit in the digital media. They are citizens who can use technology without harming people who benefit from the communication right on the digital media as well as showing the right attitude while sharing anything on digital media which paves the way for its being a model for the people toward those attitudes (Çubukcu and Bayzan, 2013). Furthermore, in the study by Çubukcu and Bayzan (2013), digital citizenship was defined in general terms as the behavioral norms that occur in the integration of the rights and responsibilities related to technology use. In summary, digital citizenship can be defined as the adoption of appropriate attitudes and behaviors of individuals while using technology by assuming responsibility for their actions (Mossberger et al., 2007).

In a study by Ribble (2015), all the states of the concept of digital citizenship were analyzed, which he then separated into nine dimensions: "Digital Access, Digital Trade, Digital Communication, Digital Literacy, Digital Ethics, Digital Law, Digital Rights and Responsibilities, Digital Health, and Digital Security." As technology has become essential in our daily lives, it is important that it is used safely and effectively. Digital citizenship refers to the ability to use technology correctly and appropriately rather than merely using it. As technology gains more importance, the digital citizenship concept will also become more important. An examination of the studies conducted in this field reveals that most of them focused on citizens and their privacy, security, accessibility by everyone through technology as well as their communication possibilities and their health and ethical dimensions (Çubukcu and Bayzan, 2013; Kaya and Kaya, 2014). Netwong (2013), conducted a study in order to reveal the relationship between digital citizenship and learning success and also to increase the learning success and digital citizenship in the field of Information Technologies for university students through e-learning. The study group in the research comprised a total of 49 students. The tools used to collect the data included a questionnaire about digital citizenship and the e-learning success test of Suan Dusit Rajabhat University. As a result of the e-learning, the digital citizenship development increased by 15.85%, and the learning success development increased by 23.37%, thus demonstrating that there is a strong correlation between digital citizenship and learning success. Jones and Mitchell (2016), developed a digital citizenship scale for the online civil participation dimensions as well as for respectful online behavior. In their study, they emphasized that there is growing interest toward the improvement of digital citizenship through education. The results showed that younger people exhibited less respectful online behavior and also in terms of the civil participation dimension and respectful behavior, females had higher scores than males. Choi et al. (2017), conducted a study aimed at creating an extensive digital citizenship scale that relates and includes the sub dimensions of digital citizenship which young people could use to measure their participation skills for the Internet based community, their Internet levels and perceptions. In order to determine the sub dimensions of digital citizenship and also to evaluate its reliability and validity, exploratory factor analysis, confirmatory factor analysis, and relational analysis were all used. A total of 72 graduate and 436 undergraduate students at a large western university participated in the research and it was found that the digital citizenship scale measured the students' skills, perceptions and participation level for the Internet based community in different dimensions. The research emphasized that the scale was effective in terms of informing students, educating them, make them effective digital citizens and providing the necessary conditions for raising the digital citizenship to a higher level.

An examination of the studies included in the literature review shows that all the studies we have analyzed have used scales in order to reveal levels of digital citizenship. Additionally, the researches were generally conducted with students. According to the results of the researches, when training was provided to the participants, they were more informed about digital media and they used this knowledge to achieve their educational aims and these results contributed to the future studies to be used in terms of multiple scales and resources. As people encounter digital media frequently and such forms of media eliminate all the limits related to communication and exposure, the formation of the digital community can be regarded as a very important step. In particular, teacher candidates are faced with digital generations who are exposed to the rapidly changing technologies and exposures, which may cause the candidate teachers to experience problems with regard to technological proficiency and awareness. The frequent use of those media brings together the need to evaluate the program contents as well as need to consider the current state to ensure that students develop a suitable level of digital citizenship awareness. Therefore, a needs analysis for primary classroom teachers and candidate teachers in the last year of their studies should be performed to

determine their digital citizenship levels and the development of "Digital Citizenship Education" to meet those needs is very important. Accordingly, the aim of this study is to determine the digital citizenship levels of primary classroom teachers and the candidate teachers in their last year at the university as well as to compare them and reveal their needs. Based on this aim, a needs analysis was conducted.

METHOD

Research Model

A case study model was used, which is a qualitative research pattern. In case studies, an event, situation or a program is analyzed and evaluated according to different dimensions (Yin, 2017). The extensively and systematically obtained data for the current situation/s in this process are holistically analyzed and the current situation is then assessed and described in great detail (Johnson and Onwuegbuzie, 2004; Yıldırım and Şimşek, 2008; Patton, 2014).

Participants

This study was conducted with a total of 65 individuals, comprising 38 primary classroom teachers and 27 candidate teachers studying in the last year at the classroom teaching department during the 2020–2021 fall semester. The participating teachers and candidate teachers were chosen according to the targeted random sampling method.

The aimed random sampling is the assorting the systematically and randomly chosen case samplings according to the objective of the research (Marshall and Rossman, 2014). Moreover, the reliability of the obtained information is considered to be higher when using this method (Creswell, 2016).

Data Gathering Tool

In order to gather the qualitative data of this research, a literature review was done on the topic and then a "Digital Citizenship Interview Form" was prepared, which included open-ended questions that were developed based on the information acquired from the literature review. This form contained questions related to the nine sub dimensions of digital citizenship and an initial draft was prepared. After that, the draft was presented to five academicians from different universities who were experts in different fields to obtain their feedback. The questions were prepared with the help of the feedback of these experts and they were reshaped according to the paradigm of language and expression and of the qualitative research, resulting in the final version of the form. To determine how long it would take to complete the interviews as well as to evaluate the comprehensibility and answerability of the questions, it was decided that a pilot implementation would be made. Therefore, before sharing the interview form with all the participants, one teacher and two candidate teachers tested the form during the pilot implementation stage to assess the questions' answerability and time saving features. Subsequently, the questionnaire was sent to participants online by using Google Forms in order to gather the data and feedback from them.

Data Analysis

The qualitative data of the research were written on computer media and data texts were taken. After this, all the texts were uploaded to the QDA Miner Lite program. The raw data were analyzed by the researchers very carefully before being coded. During the data coding, open, axial, and selective coding techniques were used so as to form a unit for one-sentence-data analysis or word groups or words according to the line-by-line analysis. All coding's were structured according to the free coding using the qualitative data analysis functionality QDA Miner Lite. As there was no previous code list for the research problem the grounded theory coding process was applied. During the interpretation of open-ended questions; inductive descriptive analysis, content analysis and constant comparison techniques were used. During the content analysis, free coding focused contexts were considered and the created codes were combined under a common category. In the last phase, the cohesion of the themes obtained from the data was ensured and the interpretation process was completed.

FINDINGS

As illustrated in **Table 1**, in terms of the technological environment in the school variable, 21 of the classroom teachers (21.6%) expressed that they mostly used computers. However, the candidate teachers used the computers less (13.4%) and preferred using projectors (40.3%). On the other hand, according to the answers for the use of technology outside the school environment variable shows that both classroom teachers (27.8%) and candidate teachers (38.8%) mostly used smartphones. A large proportion of the teachers (81.6%) and the candidate teachers (50%) mentioned that they had not experienced any unethical behavior on digital media.

According to **Table 2**, analysis of the digital security sub dimension indicates that the precautions that the teachers and candidate teachers take vary; most of the teachers prefer "not to share personal and private information" in order to maintain a more secure digital environment, whereas the candidate teachers prefer not to enter to the sites that they do not believe are secure. Some of the teachers (23.3%) gave the answer "forming a group" whereas the remaining teachers said they did not have any information.

As illustrated in **Table 3**, most of the teachers said that they use all digital communication tools (39.7%) according to the answers, while Instagram and Short Message Service (SMS) are used the least (3.2%). The classroom teachers (84.2%) are well informed about the sub dimension of digital law and they were aware of that these were negative should not be used. The candidate teachers mostly benefit from the Internet for reading newspapers (17.0%). On the contrary, six of the teachers said that they prefer not to use the Internet by mentioning that they wanted to benefit from written resources such as newspapers, journals, books, etc.

The responses of the teachers and the candidate teachers regarding the negative effects on health are revealed in

TABLE 1 | The distribution of classroom teachers and candidate classroom teachers according to the sub-dimension of digital access and digital ethics.

Sub dimension	Variable	Themes	Teacher		Candidate teacher	
			Frequency(f)	Percent(%)	Frequency(f)	Percent(%)
Digital access	Technological environment in school	Projection	14	14.4	27	40.3
		Smart board	2	2.1	0	0.0
		Mobile device	9	9.2	0	0.0
	Technological environment outside the school	Smart phone	27	27.8	26	38.8
		Computer	15	15.5	1	1.5
		Tablet	3	3.1	2	3.0
Digital ethics	Unethical behavior	Stealing of social media	3	7.8	0	0.0
		Swearing	2	5.3	5	25.0
		Being disrupted	2	5.3	0	0.0
		Not any	31	81.6	10	50.0

TABLE 2 | The distribution of classroom teachers and candidate teachers according to the sub dimension of digital security and digital rights and responsibilities.

Sub dimension	Variable	Themes	Teacher		Candidate teacher	
			Frequency(f)	Percent(%)	Frequency(f)	Percent(%)
Digital security	Precautions	Not sharing personal and private information	13	28.9	1	3.2
		Not dealing with unfamiliar people	6	13.3	4	12.9
		Not entering every site	10	22.2	10	32.3
		Putting password	4	8.9	5	16.1
Digital rights and responsibilities	Fundamental rights	Giving opinion	8	18.6	9	36.0
		Forming a group	10	23.3	5	20.0
		I have no information	10	23.3	3	12.0

TABLE 3 | The distribution of classroom teachers and the candidate classroom teachers according to the sub dimension of digital communication, digital law, and digital literacy.

Sub dimension	Variable	Themes	Teacher		Candidate teacher	
			Frequency(f)	Percent(%)	Frequency(f)	Percent(%)
Digital communication	Digital communication	WhatsApp	12	19.0	11	33.3
		Viber	5	7.9	0	0.0
		Messenger	8	12.7	1	3.0
		E-mail	6	9.5	5	15.2
		All of them	25	39.7	11	33.3
Digital law	Prohibited broadcasts	I use positively	4	10.5	23	85.2
		Negative/should be banned	32	84.2	4	14.8
		I have no information about the topic	2	5.3	0	0.0
Digital literacy	Benefiting from the internet	Newspaper	15	17.0	4	8.5
		All	14	15.9	7	14.9
		Google	22	25.0	11	23.4

Table 4. According to the teachers, the digital environment had both physical and psychological negative effects (52.8%), whereas according to the candidate teachers, the negative effects are more psychological (37.5%). The majority of the classroom teachers thought that online shopping is insecure (21.7%), so they do not shop online.

DISCUSSION

As a result of the sub dimension of the digital access of the digital citizenship, both the classroom teachers and the candidate classroom teachers used projectors and computers inside the school, whereas outside the school, they mostly used smart phones by actively benefiting from the digital technology

TABLE 4 | The distribution of classroom teachers and candidate classroom teachers according to the sub dimension of digital health and digital trade.

Sub dimension	Variable	Themes	Teacher		Candidate teacher	
			Frequency(f)	Percent(%)	Frequency(f)	Percent(%)
Digital health	Negative effects to health	Physical	10	27.8	7	29.2
		Both physical both psychological	19	52.8	5	20.8
		I have no information about the topic	4	11.1	2	8.3
Digital trade	Online shopping	Time saving	6	7.2	18	39.1
		More reasonable price	12	14.5	1	2.2
		Not using due to insecurity	18	21.7	3	6.5
	Internet banking	Time saving	22	26.5	11	23.9
		Not using due to insecurity	6	7.2	1	2.2

This result shows adjustment with the results of the study conducted by Vural and Kurt (2018) and it is concluded that individuals from all areas of society are able to access digital equipment-tools and the applications in their daily lives, especially through mobile devices.

In terms of the sub dimension of digital ethics, a large majority of both the classroom teachers and the candidate classroom teachers mentioned that they had not faced any unethical behavior in the digital environment. Three classroom teachers said that their social media accounts had been hacked, two classroom teachers and five candidate classroom teachers said they had experienced swearing in the digital environment and two candidate classroom teachers also mentioned that they had encountered fake accounts on the digital environment. Regarding these results, both the classroom teachers and the candidate classroom teachers stated that they had insufficient knowledge about digital ethics and needed to receive seminar style trainings. There has been a serious increase in the rate of cybercrimes and there have not been sufficient informative studies on this subject, indicating that it requires more attention Çolak et al. (2011). These opinions support the view mentioned above. In his doctoral thesis, Sari (2019) conducted a seminar on the behaviors of teachers in terms of the ethical use of digital technologies and found that this seminar had a positive effect on the teachers. After this seminar, the teachers began to behave more sensitively in terms of obeying the ethical values on the observed digital environment.

Within the frame of the sub dimension of digital security; both the classroom teachers and the candidate classroom teachers attached importance to digital security. The participants stated that they did not share private information on the digital environment, did not deal with unfamiliar people, they used antivirus programs, used passwords and changed them regularly. Similarly, the results of the study conducted by Symantec (2010) were similar to ours and it was found that children were aware of the rules about secure browsing in the online environment, but they could not keep pace with the rapid changes in the online environment. Our results are not in agreement with those of Takavarasha et al. (2018), who emphasized that individuals did not consider the digital security factor.

During the interview with the classroom teachers and the candidate classroom teachers, in terms of digital rights and responsibilities, they stated that they were citizens who actively join to express their opinions effectively, comment, form groups and who participate in discussions. However, 10 classroom teachers and 3 candidate classroom teachers said that they did not have any information about the topic as well as being insufficient about it. According to the literature Tan and Merey (2021) students were aware of the right to freedom of expression, obtaining information and communication rights and they also knew that rights and the responsibilities that humans have in their social lives also exist in the digital environment.

In terms of the sub dimension of digital law, the classroom teachers were more aware of the digital laws than the candidate classroom teachers. The candidate classroom teachers did not have information about the digital laws, therefore they downloaded videos, films, music, games, etc., without permission in terms of plagiarism and they did not make references to the information they gathered from the Internet for their homework. This result of the research has in agreement with the results of Beder (2015). In his study, it was found that secondary school students did not use the Internet securely, they shared posts that would cause problems and they plagiarized online materials. On the other hand, Aslan and Çakmak (2018) analyzed this dimension as digital right and responsibility dimension and at this point, they found out that the participants behaved consciously but sometimes in deliberately sometimes they could not obey the plagiarism rules. The participants stated that they did not follow the rules mostly in relation to downloading films and music.

An examination of the digital literacy sub dimension revealed that the classroom teachers had used their digital literacy to access online news websites, up-to-date journals or books and also preparing lessons on the digital environment. According to Sarsar and Engin (2015), a good digital literate teacher is a model for his or her students. As the teachers are connected to the generations to raise in their own effect area, it is important for this generation to grow up with the most meaningful and up-to-date knowledge. With the findings that Onursoy (2018) obtained, within the use of the technology by the youngsters their digital literacy levels are parallel to this use but their literacy is lower.

Analysis of the digital trade sub dimension shows that both the classroom teachers and the candidate classroom teachers engaged in online shopping. As part of the digital trade the Internet banking theme was used by the classroom teachers especially due to the fact that it saves time and they preferred this type of banking instead of going directly to the bank. In their study Kaya and Kaya (2014) stated that candidate teachers did shopping in the online environment. Another study Aslan and Çakmak (2018) stated that the candidate teachers made e-payments *via* credit card to pay Public Personnel Selection Exam (KPSS) or Student Selection and Placement Exam (ÖSYM) exam application fees, but other than this, they tried not to do online shopping *via* unsecure sites. Furthermore, the candidate teachers mostly perceived online trade to be banking and online bank account follow-up, which is similar to the results of our study.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation. All participants gave written informed consent in accordance with the Declaration of Helsinki. The study was approved by the Scientific Board of Near East University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

HT designed and carried out the study and contributed to the analysis of the results and to the writing of the manuscript. ES designed and carried out the study, collected data, and contributed to the writing of the manuscript. Both authors contributed to the article and approved the submitted version.

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The Problems of the COVID-19 Pandemic in Higher Education

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Since the outbreak of the pandemic COVID-19, many studies have been conducted to examine how education has responded to the challenges of a completely new situation that has led to the spread of distance education as the only form of instruction. In this study, data were collected and analyzed to understand the difficulties of distance education that higher education students faced during the pandemic. Our goal was to present the results of a socio-psychological study of accessibility, educational resources, applications, and distance learning technologies. A total of 160 students from different Moscow universities participated in the study. A qualitative research method was used for the study. For this purpose, mainly in-depth interviews were conducted to find out the participants' views on distance education. The data obtained were analyzed by the researchers using qualitative analysis methods. The results showed that all students faced technical difficulties during distance learning, such as poor internet connection, lack of access to online platforms due to the high number of users, lack of necessary equipment, and individual space for online learning. The results also showed low technical readiness for distance education and low quality of online resources, as well as cyber threats during online courses. In addition, the results showed that most students indicated that they would prefer a hybrid form of instruction that combines distance and face-to-face instruction. Implications for further studies are drawn in the conclusion.

Keywords: distance learning, pandemic, COVID-19, the system of higher professional education, digital platforms

INTRODUCTION

Since the outbreak of the COVID-19 pandemic, one of the most pressing research topics around the world has been the introduction of distance learning and the development of online education and training (Jacques et al., 2020, 2021; Zagkos et al., 2022). All over the world, research has focused on how education is responding to the challenges of an entirely new situation in which distance education has become the only form of knowledge acquisition and learning. The initiative of the consortium of participants in the World Education Leadership Symposium (Vachkova et al., 2022)

and the international project World School Leadership Study [WSLS] (Huber and Spillane, 2016) can serve as an example of an international project. This project collected and analyzed data on the difficulties faced by school education participants around the world in the context of the pandemic and the full transition to distance education. The scientific community around the world has been struggling to cope with the global risks and challenges created by the pandemic COVID-19. This situation has led to the accumulation of research studies on the problem and the development of distance education in schools to investigate the most effective ways to solve the challenges under extreme conditions during the pandemic. The analysis of existing research on the aforementioned problems revealed several opportunities to identify new trends in the development of distance education during the pandemic (Galimova et al., 2019; Ulyanina, 2020).

METHODOLOGICAL FRAMEWORK

Experience in the Implementation of Distance Education: International Analysis of Practices

The spread of the COVID-19 pandemic in early 2020 led to the largest disruption of the entire education system in the world. More than 1.5 billion students in more than 190 countries had to leave school to go to school. The closure of schools and other educational institutions affected exactly 94% of the world's students (United Nations, 2020). Moreover, the disruption of the educational process has serious consequences not only in the context of ensuring the right of students to education but also in the context of the economic and socio-political development of higher education. On the other hand, the crisis in the school system has triggered a new impetus for the emergence and development of innovative methods in the educational process (Lipatova et al., 2015; Kalinina et al., 2017; Salakhova et al., 2017; Valeeva et al., 2018; Joshi et al., 2020). From this perspective, educational innovations have affected all educational stakeholders, including parents, students, and teachers. To ensure continuity of learning during the pandemic, innovative approaches such as radio and television broadcasts were used for school lessons. In addition, other measures such as e-interviews (Temsah et al., 2021a), video interviews (Joshi et al., 2020), mobile learning (Bacolod, 2022), and distance learning (Mitin and Mitina, 2020; Tugun et al., 2020; Usak et al., 2020; Nagovitsyn et al., 2021; Qarkaxhja et al., 2021; Rerke et al., 2021) were taken to ensure continuity of the educational process.

In Argentina, for example, an educational website called "Seguimos Educando" has been created for students at all levels of schooling (Argentine Ministry of Education, 2021a). Seguimos Educando uses a virtual platform that brings together television, radio, and print media to provide educational support to students. In addition, a variety of digital technologies (with a description and download links) were created and published for students (Argentine Ministry of Education, 2021b). Collections of digital teaching materials and resources for students, organized by grade level, have been published through this platform (Argentine Ministry of Education, 2021c).

Austria is another country that has implemented effective distance education practices. For this, a specialized section for students, teachers, and parents has been created on the website of the Ministry of Education, which contains up-to-date information on the implementation of distance learning during the pandemic (BMBWF, 2021). The Austrian Ministry of Education has developed the Eduthek content platform, which includes educational materials for learners of all ages. To improve the effectiveness of online education, a portal for distance learning services has been developed in this country. The provision of consulting services organized by the Austrian government for all participants in the educational environment deserves special attention. In another country, distance education is based on the use of educational television and broadcasting educational technologies through the YouTube channel in Brazil (YouTube, 2021). An educational online platform "AULA EM CASA" has also been designed to answer the need to shift training to the online mode.

Since March 2020, a digital learning system has been implemented in the territory of Bulgaria, which provides information and methodological support for all students. The country has also created a National Electronic Library (electronic content repository), which publishes materials from expert teachers on their activities in the digital environment. Education in schools is carried out on the Microsoft Teams platform (Ministry of Education and Science of the Republic of Bulgaria, 2020).

The experiences of distance learning in the United Kingdom indicate that the country has carried out large-scale work not only to create innovative technologies for teaching practice but also to implement a reform to the school system. In addition to the educational platforms, the country is constantly monitoring the implementation of the child's rights in education (control and supervision of the activities of mobile operators, control of Internet providers, collection of information about the operation of online platforms) (Find Government Services and Information GOV.UK, 2020; National Literacy Trust, 2020).

A specialized platform Aptus has been developed in Chile, on which digital resources are collected to provide distance learning (video lectures, assessment, and monitoring system) (Aptus Potenciadora Educacional, 2020). China has created and operated a national state educational online platform with total coverage of more than 180 million students and support for 7,000 servers (China National Online Education Platform, 2020). Colombia has created Aprender digital, a digital platform of the Ministry of Education, with over 80,000 digital learning resources, organized by grades in various forms (games, videos, etc.), available to teachers, principals, and other stakeholders in the educational process, covering preschool, primary and secondary school education (RTVC y Ministerio de Educación Nacional, 2020). For families who do not have access to the Internet, the government has developed a homeschooling kit. Also, in the territory of the country, educational programs are broadcast on state radio and television for primary and secondary school students. In Croatia, students can access digital content

through the portal "Skolaza Zivot" (Ministry of Science and Education of The Republic of Croatia, 2020). Instruction in educational institutions is carried out using platforms: Loomen, Microsoft Teams, and Yammer.

The experiences of the Czech Republic have included a specialized website "distance education" that was designed for implementing distance learning (Specialized website "Distance education", 2020). The developed platform includes a wide range of opportunities for the realization and support of online learning: digital content for students, a list of links to digital educational resources, practical advice for teachers and parents with detailed video instructions, training webinars, and masterclasses, etc. In France, the epidemiological situation prompted the creation of the online portal Ma classe à la Maison by the National Center for Distance Education (CNED) (Ministre de l'Education Nationale de la Jeunesse et des Sports, 2020). The online portal Ma classe à la Maison is not only a set of educational resources but also an "educational device," the architecture and structure of which are aimed at helping the student in mastering new educational material. The technical and methodological support of the online portal is carried out by the CNED service, which increases the effectiveness of the educational activities of the teacher. In addition, educational content is hosted in digital work environments: "Environment Numérique de travail"–ENT; EcoleDirecte, ProNote, etc.–internal school networks (intranets). In addition, television, and radio broadcasting facilities (France Télévisions, Radio France, Arte, and National Education) are included in the educational process to expand learning opportunities in France. The resources are available through podcasts, streaming, or playback on national websites and platforms.

The experience of implementing distance learning in Italy also testifies to the development and creation of new educational resources and online platforms (Ministero dell'IstruzioneMinistero dell'Università e della Ricerca, 2020). Italy has also created the platform of the National Institute for Documentary, Innovative and Educational Research (INDIRE), aimed at providing methodological support for teachers in the development of information technology (INDIRE, 2020). National television and radio broadcasting programs have been used to implement online educational activities in Italy. Great importance in the country's education system has been given to pedagogical training and the continuity of distance learning practices [La Scuola per la Scuola community; Next-Level Association; ITE Tosi; Institute of Educational Technologies (ITD) of the National Research Council].

In Spain, the INTEF educational platform has been created to ensure the online educational process, which includes more than 100 thousand educational resources in various Procomún formats (INTEF, 2021); the educational portal Educlan for professional adaptation of teachers to the distance learning mode (EDUCLAN, 2020). Distance education in the United States varies from state to state. For example, in South Carolina, the online state program VirtualSC has been developed (VirtualSC, 2020). North Carolina has an online collection of resources and best educational practices (North Carolina Remote Learning Resources, 2020). Mainly e-mail, Zoom, and Google Meet have been used as communication tools between teacher and student.

In India, educational portals were used to implement distance learning portal "DIKSHA" (DIKSHA, 2020); "E-Pathshala" (NCERT, 2020); the portal of the National Repository of Open Educational Resources "NROER" (NROER, 2020); Swayam Prabha (Swayam Prabha, 2020). In Indonesia, distance education is supported by the educational television "Televisi Pendidikan Indonesia" (Televisi Pendidikan Indonesia, 2020). The platform "Rumah Belajar" (Rumah Belajar, 2020) provides a learning management system, digital lesson delivery, e-textbooks, and assessment tools. Other educational platforms included Google Suite Education, Smart Class, Microsoft Teams, Quipper School, Sekolahmu, and Kelas Pintar.

In Jamaica, educational materials have been prepared for students who do not have the opportunity to access the internet. TV lessons and transmissions are included in the educational process (for example, "School is not OUT" on the TJ Live channel). Also, access has been provided to digital educational resources (One on One Educational Services, Cheetah, Book Fusion, Edufocal, Learning Hub, CSEC COVID-19 Toolkit, etc.).

There are four main platforms for educational programs and resources for students in Kenya for organizing distance education: Kenya Broadcasting Corporation "KBC" (Kenya Broadcasting Corporation, 2020); educational television programs are broadcast on Edu channel TV; KICD EduTV in Kenya on YouTube channel; Kenyan Education Cloud-hosted and supervised by KICD (Kenya Institute of Curriculum Development, 2020). To overcome the lack of Internet connectivity, Kenyan authorities have launched a program to use the Loon Google stratospheric balloon network with 4G LTE base stations (Loon Google Stratospheric Balloon Program, 2020). In Mexico, distance education "telesecundaria" has been used since 1968, and this state has not had particular difficulties in switching to online education due to the pandemic (Gobierno de México, 2021).

The presented international experience in organizing distance education, regardless of the level of economic development and experience in implementing the country's information technologies, allows us to conclude that all countries have made

TABLE 1 | Participants' demographic information for the study (n = 160).

Characteristics	Frequency	Percentages (%)
Sex		
Female	68	42.5%
Male	92	57.5%
Age range		
18–25	143	89.4%
26–33	17	10.6%
Program of study		
Education	64	40%
Engineering	56	35%
Social work	40	25%
Ethnicity		
White	160	100%

many efforts to maintain the educational process and offer online learning.

Experiences in Organizing Online Education in Russia

Across the Russian Federation, as well as in foreign countries around the world, a set of measures was carried out aimed at organizing activities for the transition of the education system to the online format. Large-scale research and monitoring, revealing the specifics of organized measures, were carried out both by the scientific community and by representatives of state authorities. For example, the HSE Laboratory of Media Communications in Education studied the experience of teachers who were in transition to distance learning (HSE University, 2020). More than 22 thousand teachers from 73 territorial entities of the Russian Federation did participate in the study. Four main problems were determined in the analyses. These are difficulties in giving lessons *via* video communication; lack of practice in the use of online resources; technical difficulties and organizational difficulties. The study concluded that, despite the indicated difficulties, all teachers quickly mastered the required digital skills and successfully adapted to the new form of teaching. This finding is reflected in the UNESCO report on the progress of distance learning during the pandemic (UNESCO, 2020).

The People's Foundation conducted a study whose results showed that more than 80% of teachers faced organizational, technical, and adjustment difficulties in implementing distance education. Among the students' problems, teachers mentioned the lack of necessary equipment for online learning (*via* computers, tablets, phones) and problems with Internet connection (Vachkova et al., 2022). The study of students' and parents' opinions on distance education was the subject of a study conducted by experts from the project PF "Equal Opportunities for Children" and the National Education Resources Foundation. The results of their analysis showed that the overwhelming majority of both school children and parents do not want to replace offline learning with a distance form. More than 80% of respondents (children and parents) also reported technical difficulties, slow internet connection speed, and deficiencies in educational platforms and resources.

The analysis of the results of the transition to distance education was conducted by Moscow State Pedagogical College, HSE Institute of Education (Adamovich et al., 2020), and their international partners, Research Center for the Socialization and Personalization of Children's Education at FIRO RANEPA (Tarasova et al., 2020), NAFI Analytical Center, etc. The results of these studies confirm that, in general, the Russian education system has coped well with the transition to online mode. However, many teachers have found that the transition to distance education has caused a different range of problems that require additional effort. Therefore, the present study aims to understand the difficulties of distance education faced by higher education students during the pandemic. We also aimed to understand the accessibility, educational resources, applications, and distance education technologies in higher education during the COVID-19 pandemic.

RESEARCH METHODS

Since this study is empirical research to understand the difficulties of distance education faced by higher education students during the pandemic, an exploratory and descriptive case study approach was used. In-depth interviews were the main data collection tool. Case study research is appropriate for the acquisition of an in-depth understanding of the behavior and experiences of individual participants in a natural setting (Patton, 2002).

A large-scale socio-psychological study among students from Moscow universities was carried out to study the problems of accessibility, educational resources, applications, and distance educational technologies during the pandemic. The research included in-depth interviews of the participants voluntarily. An unstructured interview was conducted with students according to a previously prepared script (guide) with audio recording. The interviews were conducted by researchers with training in the interview process. Interviews averaged 20 min in length. Interviews were recorded with the participants' permission. All the interviews were transcribed and reviewed by researchers. To collect the data for the present study, necessary approval procedures were received by the Moscow City University, which enrolled the participants in this study. This research was conducted under the approval of the Moscow City University institutional review board.

The developed script of the interviews, which provided the possibility of subsequent use of qualitative analysis of the processing of the data, served as a toolkit. When developing the interview guides, various types and forms of questions were used to determine general and specific problems in the accessibility, educational resources, applications, distance learning technologies, as well as their satisfaction with the services provided to them. To analyze the data gathered from the interviews, we used open-ended coding methods as suggested by Strauss and Corbin (1990). A total number of 160 students from various Moscow universities were involved in the interviews. The participants' demographic information is given in **Table 1**. The participants were a convenience sample of higher education students who enrolled at the universities during the pandemic in Russia. All participants ranged in age from 18 to 27 (M = 20.5, S.D. = 1.2). The key criterion was that all participants had to be higher education students. The participants were involved in the study voluntarily. The male to female ratio was 92–68. All of the participants were predominantly white people. Permission to conduct the study was granted by the Research Ethics Committee of the Faculty of Education of the Moscow City University. Before beginning the interviews with the participants, they were informed about the purpose of the study so that they participated knowingly, and their confidentiality and anonymity were assured. The interviews were conducted between February 1, 2021 and June 1, 2021. The organizational platform of the online research was the Zoom service.

In our study, responses from the interviews were used only to understand the difficulties of distance education faced by higher education students during the pandemic, and no statistical analysis was performed on the results. Since the data obtained from the interviews provide an in-depth understanding of the

difficulties of distance education faced by higher education students during the pandemic, no other data sources were not included in the study.

In the data analysis, qualitative content analysis was conducted by researchers. For the analyses, all of the researchers read the transcripts. Later, the researchers began to code the transcripts. While doing this coding, researchers determined codes and themes that emerged from the data. The transcripts were constantly compared to see what patterns or themes emerged in the interview data. The coding of data into themes was conducted independently by two researchers. After this coding, two researchers met and compared their codes. When there was no consensus on codes, researchers discusses their coding and reached a consensus on the coding.

Trustworthiness in this study was ensured by using triangulation and member-checking methods. The triangulation aims to evaluate the accuracy of the data (Merriam, 1998). For the triangulation, the authors sought to obtain rich data to answer the research question. Another method, member checking was used to reduce the impact of subjective bias (Patton, 2002). For this procedure, the researchers distributed the analyzed themes from the interviews to the participants and asked them about the accuracy of the data.

RESULTS

In our results regarding the organizational conditions for distance learning, all students (160 people) emphasized the low technical readiness of electronic platforms and applications (Zoom, Teams), as well as the quality of these electronic resources on the Internet. The students indicated that the quality of courses did completely depend on the work of these electronic resources. Sample quotations from students' are as follows: "We just flew out of Zoom, for example, and the screen darkened," "The teachers were hard to hear and everything was always freezing," "Problems emerged with connection and it was not clear what the lecturer was saying, I had to ask again."

- In addition, 16 students out of 160 respondents reported cyber threats (attacks) while studying online. For example, "Hackers wrote. Someone wrote obscene phrases passing himself off as other students. We had a lot of such things. felt sorry for the teachers."
- Almost all students, except for students living in a residence hall, mentioned the presence of their home workspace for distance learning. It was difficult for these students to organize their attendance in distance classes. All students had technical tools (computer/laptop/tablet/phone) for distance learning. However, most of the students (121 out of 160) generally preferred to use a tablet or phone rather than a computer. The following quotations for these results are: "Using the phone is more convenient and more mobile," "You can walk around the house with it," "You can attend to your business," "You can stay in bed and turn on a lecture on the phone," "You can turn on the lecture on the phone and at the same time do your homework on the computer."
- Regarding the involvement of students in distance learning technologies, the participants expressed the following quotations: "At the beginning of the distance learning format it was interesting, and then it became terribly boring," "Interactive activity was interesting, but not all lecturers bother with it," "It was difficult to understand the subject and master the information. The poor quality of the Internet service always forced us to revise the material," "Everything was easy and standard," "It was just our duty to study remotely," and "I kept on studying. There was no particular interest."
- These listed judgments allow us to conclude that all students consider the transition to distance learning as a requirement for teaching. Students showed their interest in this form only at the beginning of self-isolation and explained it by the possibility of not attending a university. However, after the lapse of time, this interest was flagged. In addition, a negligent attitude toward online classes has appeared.
- As part of the study of student's assessment of the quality of the provision of training courses, additional education during the period of distance learning and its impact on the quality of educational results, study load, contradictory data were obtained. Some students (89 out of 160 children) mentioned that the transition to distance learning has nothing to do with the quality of mastering academic disciplines and everything depends only on the student himself. Others, on the contrary, emphasized the importance of face-to-face education and the decline in learning outcomes due to the transition of classes to distance learning (71 out of 160). It is worth noting that the conclusions obtained on this block of questions do not find any relationship with the category of students but depend on individual personality traits (locus of control, level of development of the emotional-volitional sphere, the intellectual level of development, character traits, temperament, etc.).
- As part of the study, on the attitude of students to the future opportunities and directions of development of distance learning, 71 out of 160 students expressed negative attitudes. For example, among the students' judgments about the future of distance learning, the following judgments were recorded: "I would rather keep attending classes at university. It is impossible to study at home. Home is not for learning," "There must be no distance learning. There is no control. Nobody learns. Everyone goes about his business," "I became more independent during my online studies," "Everything is clear at university. The lecturer when he explains the material, you can ask, and he will explain everything. This cannot be done online," and many others.
- However, 89 out of 160 students emphasized the importance of combining distance learning and the traditional form in the future: "It is advisable to combine distance learning and university studies. Some lectures can

be missed," "A 50% to 50% form would be ideal," "Distance learning is more mobile and more rational. Why, under compulsion, attend classes that are not interesting and unnecessary"?

- The data obtained indicate that students of higher educational institutions in the city of Moscow have a more negative attitude to distance learning. However, despite their attitude, most students believe that the optimal form of training lies in a hybrid form. Students believe that only by combining distance learning online and full-time format, effective learning outcomes be possible. One hundred and twenty-nine students out of 160 said that "In our group, basically all students work, and it would be great if the attendance was not considered when assessing the student's academic performance," "I work and it is very difficult for me to get to the university physically by a certain time, but I'm fine I learn the material online. I am for online courses," "There are subjects, for example, "of general orientation," which can be changed over to an online format. The quality of education would only benefit from this," "A hybrid form means new opportunities! It is cool and great."

DISCUSSION

The purpose of this study was to explore the results of a socio-psychological study to understand the problems of accessibility, educational resources, applications, and distance educational technologies in higher education during the pandemic. Our results revealed that nearly all higher education students (160 people) did emphasize that they had problems with the low technical readiness of electronic platforms and applications (such as Zoom and Teams), as well as the quality of these electronic resources on the Internet in general. These results are consistent with those of studies conducted in other countries (Leontyeva, 2018; Devkota, 2021; Lakshman Naik et al., 2021; Nsengimana et al., 2021; Zapata-Garibay et al., 2021). In general, many studies (Leontyeva, 2018; Devkota, 2021; Lakshman Naik et al., 2021; Nsengimana et al., 2021; Zapata-Garibay et al., 2021) reported that the students in the higher education level had some problems regarding technical equipment, the quality of internet, and applications for distance education during the pandemic. The reason for these problems may be that the emergence of the COVID-19 pandemic was at an unexpected time. Therefore, institutions, scholars, and students were not prepared for this pandemic and knowledgeable about what they would encounter in the pandemic. Because of this reason, the unpreparedness of all stakeholders including scholars, students, and universities for the pandemic can be explained as the reason for this result.

Another finding is that all students had technical tools such as computers, laptops, tablets, and phones for distance learning. However, the majority of the students (121 out of 160) generally did prefer to use a tablet or a phone for their internet connection rather than a computer. These results show that the use of tablets or phone is very common in higher education. Another point from this result is that most of the students had an opportunity to connect lessons in distance education. This result is parallel to those of Zapata-Garibay et al. (2021). However, the same result contradicts the study of Rahiem (2020) who reported that university students in Indonesia had many deficiencies and inequities in finding a device to connect distance education lessons.

The results also revealed that more than half of the students (89 out of 160 children) indicated that the transition to distance learning has nothing to do with the quality of mastering academic disciplines and everything depends only on the student himself. This result is very similar to the findings of Lischer et al. (2021) who reported the experiences of the undergraduate student with coping with the challenges to their teaching during the COVID-19 pandemic in Switzerland. The study of Lischer et al. (2021) revealed that undergraduate students considered discussions in distance education as boring than in face-to-face teaching. From this perspective, the reason behind our results may be that distance education is not well-organized and/or implemented for the satisfaction of the students.

In addition, nearly half of the students in this study (71 out of 160 students) expressed negative attitudes to distance learning. This result is interesting for distance education during the COVID-19 pandemic. The reason for this result may be that, in general, the students were passive throughout lessons in distance education. This result is consistent with a recent study by Supriya et al. (2021) that shows that students perceived several negative impacts of the transition to remote learning during the COVID-19 pandemic. In particular, these negative impacts were "*. . . particularly on students' perceived understanding of course content, interactions with other students and instructors, feeling like a part of the biology community at the university, and career preparation*." (Supriya et al., 2021, p. 10). As a result of this situation, students may have been boring during the teaching. Therefore, they might consider that lessons in distance education were more sluggish than face-to-face teaching. Another reason may be that poorly prepared lessons and the deficiencies in distance teaching may have caused this result. From this perspective, it can be concluded that face-to-face classes are a substitute for teaching in higher education.

Finally, nearly more than half of the students (89 out of 160 students) indicated the importance of combining distance learning and the traditional form in the future. This result is parallel to the comments of Lischer et al. (2021). As it is well-known, institutions in various countries consider combining distance teaching and face-to-face learning from the beginning of the pandemic. This result may stem from the positive effects of active learning during face-to-face teaching. A recent study by Deslauriers et al. (2019) found that students who received active instruction had higher scores in the assessment. Based on our findings, it is important to combine distance and face-to-face teaching to overcome the deficiencies and inequities of distance learning during the pandemic. Based on the literature, there has been an effort to combine distance and face-to-face teaching in a hybrid form of teaching (Lischer et al., 2021; Temsah et al., 2021b).

CONCLUSION

The results obtained from this study showed that all students did experience technical difficulties during distance learning such as low quality of the internet connection, failure access to online platforms due to an increased number of users, lack of necessary equipment, and individual space for online classes. The results also showed that all the students depicted distance learning as a process of a high degree of complexity in terms of organizational, methodological, organizational, and technical work. In particular, the students pointed out the low level of technical readiness for online platforms and applications (such as Zoom, Teams) and the low quality of the online resources, as well as the presence of cyber threats during online courses. Our results also revealed that most of the students (129 out of 160 students) indicated that they would prefer a hybrid format for courses when switching to face-to-face education. In addition, our findings have revealed that students consider distance education technologies highly effective and motivating them in learning subjects. Namely, students believe that effective results of educational activities will be increased by combining distance and face-to-face education.

The COVID-19 pandemic is continuing. It is well-accepted that distance education is a part of teaching in higher education in the world. Because of this reason, more research is needed to examine and understand the effects of the pandemic on higher education. This study investigated the problems in the implementation of distance education in one country. Future studies should be conducted to explore the problems while implementing distance education in different countries so that differences and similarities between different countries may be revealed from these studies.

LIMITATIONS

One of the limitations of our study is the small number of participants. Our participants were students who enrolled at universities in Moscow city. It should be noted that the histories and experiences of this group in Russia are different from other students in other places of the world. Another limitation is that we used only interviews to understand the change and challenges in higher education during the pandemic. However, we agree that different data collections could be included in assessing the effects of the pandemic among higher education students. Future studies should consist of different data collection tools to obtain detailed data. Another limitation is that the data were based on the Russian higher education student's views of the problems in distance teaching during the pandemic. We need to emphasize that the results of this research are not generalizable to the country's situation in higher education.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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BRIEF RESEARCH REPORT
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The Impact and Challenges of Education and Administration in VET on Economic Growth in Oman During the COVID-19 Period

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The COVID-19 pandemic is still a major global health problem that had substantial consequences on people's daily lives. This paper evaluates the impact of education and institutional management on Vocational Education and Training (VET) schools in Oman during the COVID-19 period. The purpose of this study is to understand the impact of the COVID-19 pandemic and identify possible challenges that may affect its impact on economic growth. This qualitative research is used as the main methodology of the study. Qualitative data are collected through convenience sampling of 108 VET college students and staff using interviews and questionnaires. The study revealed that the administration plays an important role in economic growth. The students suggested that the national educational administration of the government of Oman plays an important role in their education and that this in turn churns out industry-ready individuals who will impact the economic growth. The government's role, especially financially post-pandemic lockdown, will be a critical determinant of VET's impact on economic growth. This study introduces a new perspective on education administration from the perspective of students and staff of VET colleges.

Keywords: educational administration, vocational education training, employment opportunity, economic growth, COVID-19

INTRODUCTION

When the COVID-19 pandemic broke out, people worldwide realized how important it was to keep epidemics under control. COVID-19 has brought many challenges in both schools and public places, such as in market places as well as in workplaces (Slimi, 2020). People's behavior and personality have been affected greatly. Student behaviors also changed. Everyone must wear a mask to avoid the spread of the coronavirus. In some countries, a person can be arrested for not putting on a mask. As a measure to curb the spread of the virus, certain

precautions were introduced and are enforced by law enforcement agents. COVID-19 has also affected the behavior of the individual; it has made people change their behavior, conduct, and attitude. This can be seen by how people maintain social distance in public places, regular sanitization of hands, as well as administering vaccines regardless of religion or tradition (Al Mahdouri and Al Saidi, 2020). Coronavirus has impacted immensely on socially, economically, as well as religiously. As a stern measure to curb the spread of the coronavirus, congregants were not allowed to converge in great numbers in their mosques and churches. In some instances, they were not allowed to gather at all as some communities were in total lockdown. Gathering of more than 50 people was not allowed, and in this way, the social life of people was affected.

Some countries, such as France, Italy, the United States of America, the United Kingdom, and Oman, as well as most of the African states, have lost many citizens as a result of COVID-19. Many families have lost their beloved ones due to the coronavirus. The devastating effect of the coronavirus has gone to an extent that some families have lost all parents, and in some cases, the whole family. Family members with underlining health conditions such as respiratory problems and heart problems were heavily hit by the virus if great precaution was not exercised. Those who were affected were of the economic age group (the front runners), as they were exposed to the virus. The economic age group contributes greatly to national economic growth (Al Mahdouri and Al Saidi, 2020; Slimi, 2020; Ceesay, 2021; Chumpitaz-Carrillo and Sevillano-Jimenez, 2021; Fowler et al., 2021).

COVID-19 further changed students' behavior as face-to-face learning was abandoned and an innovation was introduced. Murphy (2020) says that online learning, which replaced face-to-face teaching, has also brought its challenges. Online learning requires gadgets such as smartphones, iPads, and laptops from the learner. All these gadgets have to be bought by parents and guardians which calls for extra money for the education of the child. Data have to be provided to students for them to be always connected to their lecturers. All these are some of the challenges brought by COVID-19. As a measure to mitigate the transmission of COVID-19, certain precautions were put into place. These measures include total closure of schools, suspension of classes in colleges, universities, all academic institutions, and a restriction on traveling (intercity travel), which in summary was called total lockdown. This was announced by Oman Supreme Committee on COVID-19. As a result of this announcement, the majority of schools and higher learning institutions adjusted their programs to go by the stipulations of the COVID-19 regulations (Kothaneth, 2020).

Vocational Education and Training will play an important role in helping revive economies after the pandemic lockdown by providing the training and education needed for an industry-ready workforce (Pilcher and Hurley, 2020).

The data for this study was collected from 108 students using convenience sampling of college students and staff. The study uses a random convenience sampling technique with a few inclusion and exclusion criteria. Inclusion criteria include students who have been in VET colleges for a least one full academic semester, fully employed academic staff who have been working on the campus for at least one academic semester, non-academic staff who work within the campuses, and institutional management staff who have been fully employed for at least one academic semester. Exclusion criteria included participants conducting any current research related to the impact of COVID-19 in different contexts and respondents who have been in VET for less than one academic semester. The study was carried out face-to-face at the VET colleges. The researcher ensured not to interrupt any educational activities and only willing participants in their free time were asked to participate. The Universities' registrars were preinformed about the scope of the study before it was carried out.

Literature Review

Many investigations into the effects of education on COVID-19 were conducted during the epidemic years. For example, Albaadani and Abbas (2020) studied the impact of COVID-19 on education in Yemen. Schools and universities in Yemen suspended their activities as a precautionary measure to prevent the spread of the new coronavirus among their students. As a result of this procedure, higher education institutions in Yemen are faced with a variety of challenges that make it difficult to quickly adapt to the new environment, including Internet and infrastructure weaknesses, difficulties dealing with change, academic career stability, university economic security, the complexity of some applied disciplines, student mental health, and the costs of rapid transformation. The study made some recommendations for overcoming this situation, as well as any other urgent situations that may arise in the future that could cause the educational system to shut down, including the establishment of a hybrid education system and the activation of an electronic portal for each university. Another investigation into Nepal's educational system has been carried out to examine the effects and prospects of the COVID-19 epidemic (Pal et al., 2021). The purpose of this study is to shed light on the negative effects of the pandemic on Nepal's educational system. According to the findings, the academic community in Nepal has been struggling due to a lack of suitable and acceptable online system infrastructure and qualified human resources. In addition, limited access to the Internet in rural and isolated places makes virtual academic activities difficult (Abumalloh et al., 2021). In the wake of the coronavirus pandemic (COVID-19), virtual and remote laboratories will play an increasingly important role in classroom instruction. Using a poll of students at Imam Abdulrahman Bin Faisal University, this study investigates the projected benefits of e-learning during the COVID-19 epidemic. It provides a new approach to investigating this topic. In total, 179 usable responses were subjected to Partial Least Squares Structural Equation Modeling (PLS-SEM). To test the hypothesis of Push-Pull-Mooring, this research looked at how learners' responses changed when they were placed in virtual or remote educational environments.

Liu and You-Hsien Lin (2021) looked into how COVID-19 changed medical school education in Taiwan. An outbreak (COVID-19) has now been declared a global pandemic emergency. Although medical education has a significant

impact on health care, little is known about those effects. This brief communication focuses on medical schools in Taiwan's response to COVID-19 and how medical education has influenced that response. Ng (2021) conducted a study on the impact of the COVID-19 pandemic on preregistration medical radiation science education. According to the study's goal, preregistration medical radiation science (M.R.S.) (medical imaging and radiation treatment) education has changed because of the COVID-19 pandemic. After the pandemic, preregistration M.R.S. education curriculum adjustments were made, and the consequences of such adaptations on stakeholders were examined in this literature review. The possible influence of the COVID-19 outbreak on education, staff development, and training in Africa was studied by Ceesay (2021) as well. The main goal is to understand how the COVID-19 epidemic affects education in Africa, particularly staff development and training.

Gui et al. (2021) studied the impact of COVID-19 on the energy use of higher education buildings and the implications for future studies on educational building energy use. This research was carried out to reveal changes in COVID-19 energy use and establish the related facilities management techniques for future forms of learning and teaching delivery on virtual campuses. When the COVID-19 academic year (February 17, 2020, to February 21, 2021) and a typical academic year (February 18, 2019, to February 16, 2020) of Griffith University, located in Southeast Queensland, Australia, were compared, the data from 122 buildings across five campuses were collected by PI Vision Platform and used to compare energy use using the *t*-test and multiple linear regression. The spring 2020–winter 2020 impact of the COVID-19 pandemic on surgical trainee education and well-being has been done by Ellison et al. (2021). This pandemic's impact on surgical education and learner well-being is unknown. General surgery and surgical specialties check-in surveys were issued to Surgery Program Directors and Department Chairs in the summer and winter of 2020. They were then compared to a survey from the spring of 2020. There were statistical correlations found between items related to the self-reported ACGME Stage and the period studied.

The impact of COVID-19 on Indian schooling was examined in a study conducted. Dhanalakshmi et al. (2021) talk about the negative effects and challenges of climate change, but they also try to come up with solutions that could be used in other studies.

Following a year of the COVID-19 outbreak in Bangladesh, the impact of online education on university students' anxiety and psychological well-being was studied. As a result of the devastation caused by coronavirus disease, extreme anxiety about the academic delay (FAD) and psychological anguish have emerged as major public health concerns worldwide (COVID-19). After 1 year since the devastating COVID-19 outbreak hit Bangladesh, researchers wanted to see the effect on current university students' FAD and psychological stress symptoms of continued online education (Hossain et al., 2021).

However, on another note, in recent times (here and now), the slowness in economic growth has been necessitated by the advent of the COVID-19 crisis that created havoc in areas of production. Many industries have been closed down due to COVID-19, which directly affected production. Thousands of workers have been killed by COVID-19, among whom some of them were specialists, qualified personnel, directors of companies, skilled laborers, and even semi-skilled. All these have brought and are still imposing big challenges on the economies of nations because production is not performing at its maximum level.

Al Mahdouri and Al Saidi (2021) examined how behavioral science has contributed to shaping public policies during the COVID-19 pandemic, with a focus on the Sultanate of Oman. The outbreak of COVID-19 led to the spread of a massive global health pandemic that caused a surge in public policies adopted around the world, most notably policies related to health, travel, education, work, and freedom of movement. On the other hand, Slimi (2020) shed light on the experience of online learning and teaching in Oman in higher institutions under confinement circumstances. The paper targeted three main goals. First, the researcher sought to study the challenges of learning and teaching online in Oman. Second, to identify the opportunities offered by learning and teaching online, and third, to recommend solutions for better learning and teaching processes. Her findings revealed that although online learning and teaching are novel experiences in Oman, they are challenging experiences that have reinforced new styles of learning and teaching. Rachmadtullah et al. (2020) conducted a study that aimed to find out how effectively the use of the blended-learning learning model with Moodle applications in elementary school teacher education prepared students during the COVID-19 pandemic. This type of research has a quasi-experimental design with a pretest-posttest control group. When elementary school teachers are learning how to teach students during the COVID-19 pandemic, they can use the MOODLE blended-learning learning model. This model can be used as a network-based learning solution, as well as online.

Most previous research was done in countries with better resources and facilities than Oman, and only a few studies were done on health services, medical problems, public knowledge about COVID-19, teaching during the COVID-19 pandemic, and students' satisfaction and achievement during the COVID-19 pandemic (Chumpitaz-Carrillo and Sevillano-Jimenez, 2021; Fowler et al., 2021; Quesada-Rodríguez et al., 2021). There was also very few research done to investigate the impact of the COVID-19 pandemic on students' learning in Oman's educational system. So, the goal of this study is to figure out how VET education and administration affect Oman's economy and to look for problems that might happen during the COVID-19 period, which is when this study is done.

METHOD

The literature review highlights critical challenges and drastic changes in the educational systems during and after COVID-19. To find out how this pandemic has affected VET education and administration in Oman, this paper will look at how these problems have affected the country's economy.

This qualitative research is used as the main methodology of the study. Qualitative data are collected through convenience sampling of 108 VET college students and staff using interviews and questionnaires.

Government VET colleges across Oman were visited for the study after permission was sought from the relevant authority. In each college the researcher visited, permission was given by the registrar to have access to talk to the students in randomly selected departments. For the sake of this study, only two departments per college were worked with as a representation of the whole college, because it was not possible to work with the whole institution. The researcher wrote numbers 1 to 12, which were picked randomly by student representatives from the 12 departments in each college. Students who chose numbers one through two were automatically enrolled in the process. Volunteers from each department were worked with for data collection. The researcher was allocated a room in every college where the students were answering questions from the questionnaires. The researcher administered the questionnaires herself. This was important because the researcher could clarify any problems raised by participants. After this process, the researcher collected the questionnaires for data analysis and presentation. For the academic and non-academic staff, data were collected using focus group discussions as this was seen as befitting because they could discuss openly without any fear. The researcher sought permission from the registrar of every college to discuss the topics with the academic, non-academic, and institutional management staff who were willing to be involved in the focus group discussions. Gender and age of both the staff and students are shown in **Table 2**. Data were collected using focus group discussions. The researcher chaired the discussions. The demographical information for the participants is presented below in **Table 1**.

From **Table 1**, it is observed that the number of students is 80 which is 74% of the respondents, 10% of the respondents are academic staff, 8% of the respondents are non-academic staff, while 7% are institutional management staff. The respondents were sampled using the Taro Yamane (1967) sampling technique to get the minimum required respondents for the study using a 90% confidence interval.

$$n = \frac{N}{1 + N(e^2)} \quad (1)$$

Where n is the sample size, N is the population, and e is the margin of error. The confidence level was set to 90% making n = 98.17983254. The number of respondents for the study was 108 students and staff of VET.

Table 2 shows the gender and age distribution of the students and staff: 52.5% of the students from the VET school were male, while 47.5% were female; 70% were between the ages of 17 and 20 years, while 30% were between 20 and 24 years. For the staff, however, 63.3% were male, while 35.7% were female; 57% of them were between the ages of 24 and 35 years, while 43% of them were between the ages of 36 and 50 years.

TABLE 1 | Distribution of study respondents by occupation.

	Students	Academic Staff	Non-academic Staff	Institutional management Staff	Total students and staff at VET
Seib	10	1	1	1	1,373
Saham	9	2	1	1	645
Sur	11	1	1	1	568
Abri	9	1	1	1	538
Shinas	8	2	1	1	386
Al Buraimi	12	1	1	1	421
Al Khaboura	13	2	1	1	377
Salalah	9	1	1	1	1,086
Total	80	11	9	8	5,394
Percentage	74%	10%	8%	7%	90% confidence

Source (Ministry of Manpower, 2020).

TABLE 2 | Distribution of respondents based on gender and age.

Variables	Variable description	Frequency	Percentage
Students			
Gender	Male	42	52.5 %
	Female	38	47.5 %
	Total	80	100 %
Age	17—20	56	70 %
	20-24	24	30%
	Total	80	100%
Academic Staff, Non-Academic Staff and Institutional Management			
Gender	Men	18	63.3 %
	Women	10	35.7%
	Total	28	100 %
Age	24—35	16	57%
	36—50	12	43%
	Total	28	100%

Data Collection Tools

The study uses focus groups and interviews with the students. The benefit of this preferred technique was its explicit use of group interaction to produce data and insights that would be less accessible without interaction. The researcher further identified that focus group discussion was suitable for this research because it works very well with a qualitative approach to obtain a deep understanding of social phenomena. This method collects data from a randomly selected sample of individuals rather than a statistically representative sample of the entire population. During the discussions, the researcher moderated the process to allow order to prevail. The researcher did not have any problems because all of the staff worked together very well during the discussions.

The study questions asked during the interviews:

1. *Give one example of how education has benefited the national economy.*
2. *Why did you prefer to be enrolled in VET college rather than other colleges?*
3. *Do education and administration greatly impact national economic growth?*
4. *Discussions on various types of education in general and in particular on Oman's education system.*
5. *A brief analysis of the current education system in Oman in relation to the national economy.*

6. *A discussion on what must be done to improve the current education system.*
7. *A discussion on why VET is not like other systems of education.*
8. *A discussion on improvements they recommend their immediate institutional management should implement to enhance quality products.*
9. *A discussion on what the academic staff wishes their government to do to improve the current working conditions.*
10. *Are the online lectures effective for everyone?*
11. *Does the Ministry of Higher Education design effective software for e-learning?*
12. *Do the faculty and lecturers support the students and monitor their learning progress in emergency cases like COVID-19?*

RESULTS

In the study, the VET educational administration was found to be critical to economic growth. Many students opined that the national government should spend heavily on the country's education system, from elementary to post-secondary levels. Education is almost always a failure if the government does not provide funds to improve it. The administration should also give a national vision in several ministry sectors, according to students, to fulfill its objectives.

Administration on Economic Growth in Oman

From the focus group discussions conducted, it was revealed that the education administration plays a pivotal role in economic growth. Several students raised the important point that the national educational administration should invest a lot of capital in the education system, from primary to tertiary. If the government does not make available funds to boost the education sector, the outcome of education is normally a disaster. Students raised the idea that the administration should provide a national vision in various sectors of its ministries to meet its goals. The administration is divided into two: the national administration, which is the central government, and the educational administration, which is the head of the institution. The academic staff pointed out that the national administration (government) should coordinate the education system to achieve national goals. About 60% of the respondents opined that policies should be formulated, crafting strategies and programs that enhance the achievement of the national vision. There is a need for the government to revisit its national policies to remain viable and contemporary with what is happening globally. The government must make available funds for research, workshops, in-service courses, and conferences for the employees of various VET institutions to enhance performance. To support this, the World Bank (2008) cites Oman as one of the developing countries with rapid economic growth in a short span of time. The countries in this category are China, Japan, Botswana, Malaysia, Brazil, Indonesia, South Korea, Hong Kong, Thailand, Taiwan, and Vietnam.

The administration in various VET colleges should work closely with the national administration (government). Administration refers to several people, usually in charge of an institution. Their specific role is to coordinate and regulate all the activities taking place within the institution. The academic staff pointed out several points concerning their administration. They state that the administration must monitor, regulate, and moderate all activities around their colleges. They further explained that the administration should set the tone, culture, and strategies for the institution to realize its intended objectives as well as meet the goals of the national vision. It was also noted that the administration must have a proper structure, clear system, and excellent communication system among the institutional management, academic staff, students, and other non-academic staff to create a peaceful working environment. The students further raised the fact that the administration must regularly meet with students to hear their grievances. Meeting with the administration regularly helps to build good relationships between members of the institution, which will lead to better results that will help the country's economy grow.

The Impact of Education and Vocational Training on Economic Growth

From discussions conducted in the eight VET colleges, it was clear that there is a close relationship between education and economic growth. Many participants supported the view that education impacts greatly on the rate of economic growth in Oman. The participants, especially the academic staff, pointed out that the type of education determines the quality of skills acquired by individual citizens. The majority of the participants were of the view that a country that invests much in its education system and offers the right curriculum in its educational institutions, right from primary, secondary, and tertiary, in most cases, has a sound economy.

In their study, Hanushek and Wößmann (2007) stated that education quality is more important than educational attainment. Here, they are emphasizing the nature of the curriculum being offered. The curriculum must give a staff orientation to the students so that they appreciate careers that help boost the economy. In the discussion, it was said that VET has multiple benefits that can be classified into two groups: social benefits and economic benefits. On social benefits, we have crime reduction, individual encouragement, life satisfaction, and social integration (social fabric). On economic benefits, Oman has a labor market, a firm's performance, employees' productivity, employment opportunities, and professional and career development. All these benefits eventually contribute to the national economy. Much emphasis was also given to the government's developing and rehabilitating VET institutions to produce quality graduates that are directly linked to the labor industry of Oman. Academic staff indicated that such basic knowledge of the subject area teaches the students the skills that are directly linked or related to various job opportunities. The world's economy is changing each day, and as such, there is a need for vocational education training to change as well in their approach to meet new technological

dynamics. This is supported by Benhabib and Spiegel (2005), who say that education facilitates the diffusion and transmission of knowledge needed to implement new technologies. In this regard, it is a common scenario that normal human capital can be enhanced through massive investment and a strong commitment to human factors such as education and training. It was pointed out that vocational education training enrolments have now, over the years, been consistently higher than those in universities in Oman. This is an indication that there is more demand for the workforce in the job market, a sign of an expanding economy. Whether directly or indirectly, vocational education training is an important component of the economy, whether in the private or public sectors. It offers work-based training, which is crucial for national development.

DISCUSSION

There is a general view that if a country spends significantly on education normally, its people would be able to live a standard life and its economy would be better, which would eventually lead it to go through the three stages of development easily—the third world, second world, and first world, respectively. However, this view may not be correct since there are a lot of factors to be considered for the national economy to grow. The type of governance, education system, culture, and religion, to mention a few, would influence the economy of a country. Of the few given factors, a proper education system is the bedrock of development. Investing in education is one of the major factors that boost economic growth in highly developed countries by fostering labor and capital productivity and technological innovations that boost national production. If labor is productive, the national economy is automatically positively affected. A closer examination reveals that most third-world countries' or poor states' education policies are out of step with current global trends when compared to first-world nations. Similarly, Oman is prioritizing education as a key component in transforming its economy. Europe, the United States, Asia, and South Korea are growing relatively faster as there is high productivity. South Korea is investing heavily in its education, and as a result, its economy is growing fast. Studies by Scherer and Hue (1992) show that the United States and Europe spend about 3% of their total domestic product on executives who have a high level of technical education, and a lot of money is channeled toward research and development, which enhances the probability of innovations. These innovations have a lot of impact on economic growth; 60% of the academic staff were of this view. It shows that the staff have a clear conscience that investing in education, be it primary, secondary, tertiary, or technical colleges like (VET), is key to economic growth. However, one cannot just conclude that the citizens' spending many years in school would influence national economic growth. It does not work like that. There is a lot to be done. The national administration (the government) has to invest a lot of funds to cater to various activities in the education sector, especially VET. Research has to be carried out to find out which policies to adopt to increase the rate of economic growth. It has to be strategically planned and implemented. Human capital has to be fully resourced. Infrastructure has to be modernized to cater to technological advancement. When all is put in place, the products from the colleges will adapt to the world's dynamics. Benhabib and Spiegal (1994) argue that a more educated labor force would innovate faster than a less educated one. This is also reiterated by Lucas (1988) and Mankew et al. (1992), who observed that the accumulation of human capital could increase the productivity of other factors, thereby increasing economic growth. Societies that invest in their labor force education and improving the quality of their human capital will reap the benefits in the 21st century. With innovations such as information technology, and technological advancements in other industries, the importance of an educated workforce can be observed.

It was noted with great emphasis from both participants (the students and the VET staff) that the most effective way of utilizing public and national resources is to improve the production and efficiency of the labor force. This is only mostly achieved when a lot of resources are invested in education, vocational education training, and skills development. The million-dollar factor to speeding up their economic growth rate is to improve productivity in all sectors, especially in this era of fast economic and technological dynamics, for them to compete internationally.

In this era where technology and development are the order of the day, it is imperative that states, through their national governments, properly manage the human and physical resources of their economies. It was further raised by both groups (students and staff) that during periods such as the period of COVID-19, the government must swiftly avail funds for the provision of protective clothes for the VET staff. Also, necessary arrangements must be put in place as fast as possible to avoid loss of life. Both the students and the teachers applauded the Oman Supreme Committee of COVID-19 for the announcement of the suspension of classes as the continuation of face-to-face learning could enhance the spread of the COVID-19 virus. As an alternative to this problem, online learning was deployed. However, every innovation has its strengths and weaknesses. The introduction of online learning presented numerous challenges to students, faculty, and parents. It was pointed out that online learning requires a lot of money to procure the right and correct gear for both the staff and the students for it to be effective. Advanced technology has to be there in terms of smartphones, laptops, iPads, Wi-Fi, provision of the Internet, and also the assurance of a dependable source of power to avoid unnecessary disruption during lessons.

COVID-19 TECHNOLOGY AND VET OMAN EDUCATION CHALLENGES DURING COVID-19

This pandemic, as it is still in our midst, is calling for all nations to have a paradigm shift from their traditional way of learning in their education system to a digital and distance learning approach. However, this comes with its challenges, for instance, the cost of digital gadgets, the credibility of the material used, adherence to new rules and conformity to the new rules of the management, and the use of student personal data (Murphy,

2020). Thiele (2003) suggests that there is a need to assess these challenges on the quality of online course delivery. They should produce positive outcomes that contribute to the building of the national economy. The new learning style and the new technologies have to complement each other for the students to produce the desired results during the COVID-19 pandemic. This is consolidated by Richmond and Cummings (2005), when they say that one of the ways to accomplish effective delivery of an online course on learner outcomes is to have a learning style framework incorporated into the learning and teaching situation.

The introduction of e-learning in VET in Oman is not a new style of learning; however, its consolidation was accelerated during the COVID-19 pandemic. The government of Oman perceives e-learning positively and considers information and communications technology (ICT) as an important element of its education system to improve the quality of education. E-learning helps students in Oman access learning resources instead of forcing them to go to schools and universities (Musawi, 2002). Kothaneth (2020) adds that e-learning is not a new concept for higher education institutions in Oman and goes on to say that e-learning can help students ease COVID-19 risks.

Major challenges caused by COVID-19 are that students are distracted, teachers are not sufficiently trained, and technological infrastructure is far from fully ready to operate. All these conditions are forcing governments and service providers to be under pressure to adjust faster to ensure undisrupted learning in schools and universities during such difficult times as the COVID-19 period.

Both private and public institutions should provide and develop the skills needed to facilitate development, change, and growth to turn around the economy. The data obtained by this research reveal that Oman is competing very well with other states of the world in trying to adjust its national programs to meet the current economic challenges. This study shows that there is a positive and significant correlation between economic growth and vocational education training (VET) in Oman. The findings are parallel with the views of Easterlin (1981) who avers that vocational education training enhances technology diffusion, labor productivity, and economic growth.

CONCLUSION

The results of this study show that qualitative comments are showing the link between economic growth and vocational education training. Training of human force is key to development because it imparts knowledge and skills that are essential in the turning around of the economy. Investing in education, directly or indirectly, is linked to development because it enhances the skills and knowledge of the labor force and promotes the maximum production of goods and services. Oman, over many years, has invested a lot of capital toward improving vocational training. The nature of the infrastructure, the quality of VET products, and the caliber of institutional management staff, academic, and non-academic staff are evidence of how the government of Oman is promoting its education system. The study revealed that there is evidence to support that there is a very clear positive relationship between economic growth and VET in Oman. It is noted that there is a great link between education and administration in the economic growth of Oman. It is further revealed that Oman has invested a lot in VET by providing capital and crafting favorable policies that promote vocational training, which produces skilled labor, which is a major component in turning around an economy or in economic transformation (economic growth). Countries such as America, Britain, Germany, and Oman, to mention a few, have since used VET to determine their economic growth. The study also revealed that COVID-19 has brought many challenges, and these challenges have negatively affected the economies of various nations. Total lockdowns and semi-lockdowns have reduced production in many industries across the globe, and Oman is not spared.

Recommendations

Following the above conclusions, the following recommendations were made:

- The government should build more VET colleges to cater to more students as the enrolment in the current colleges is high and should also prepare a good platform for online learning.
- The Ministry of Higher Education, Research, and Innovation should carry out a constant evaluation of VET colleges for them to produce quality products that are skilled and effective in the job market and should introduce a software program that works with the Internet that will be free for all.
- The government, through relevant ministries, should make funds available for any improvement to VET colleges. For example, financing workshops, continuous provisional development courses for employees to enhance their skills and knowledge to meet world standards, and designing effective software for e-learning.
- Creating good working relations among employees (institutional management staff, academic staff, non-academic staff, and students).
- Introducing VET in the early stages of the education system, for example, at the primary level, would enhance specialization like what other developed nations are doing (United Kingdom, Germany).
- Improving the working conditions of employees through raises in salaries, giving them incentives.
- The policy implications of the study are that the exponential growth in vocational education training in Oman should be accompanied by suitable policies that enhance job creation across all walks of life.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary

material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Near East University Ethical Committee Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AA, FA, and GD collectively conducted the study, contributed significantly to the research, wrote and revised the article. All authors approved the final version of this article.

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COVID-19 Impact on Teachers' Organizational Commitment in Schools

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Highly committed teachers spend more effort helping their schools achieve their academic goals. The COVID-19 pandemic had a dire effect on education worldwide. However, just after a few semesters, teachers were asked to return back to schools to teach in person. This study aims to analyze the organizational commitment levels of school teachers before and after the implementation of the COVID-19 pandemic measures that resulted in a two-semester break in face-to-face teaching. In this study, a quantitative research method was utilized. Commitment levels of a total of 300 teachers were assessed in a longitudinal test by using a popular tool in order to see the relative change as a result of the COVID-19 pandemic in Cyprus. The study mainly focuses on gender, marital status, education levels, job experience, and duration of work in the organizations, and the information obtained in the form of responses was statistically analyzed. According to the results of the quantitative analysis, the sampling average for the organizational commitment was determined to be at a medium-to-high level. The commitment levels of teachers were observed to be decreased after the COVID-19 pandemic measures came to be implemented in schools. A detailed investigation of the school teachers' commitment levels corresponding to the different demographic characteristics before COVID-19 and after the implementation of normalization measures is presented in this study.

Keywords: teachers' commitment, COVID-19 pandemic, online education, school lockdown, digitalisation

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INTRODUCTION

The dynamic changes that influence societies can alter the social characteristics of individuals and disciplines. The COVID-19 pandemic resulted in the abrupt transition from school education to online distance education, with teachers being left with no time to make any preparation. Several studies were conducted on the difficulties the school teachers faced during the online education period. According to the UNESCO report (UNESCO, 2021), despite the efforts made for online education, more than 500 million people were excluded from access to education. For example, the difficulty in accessing the internet is considered as the primary concern pertaining to access to online education (Giannini, 2020). These difficulties brought new responsibilities to teachers, which came to be added to their current workload (Correia, 2020). As a result of the pandemic

measures taken at schools, the social characteristics of teachers are expected to be influenced by the additional load. According to a study by Kieschke and Schaarschmidt (2008), the commitment levels of teachers were monitored to be affected by anxiety about health conditions. Also, school teachers were observed to show reduced commitment to their organizations during the online teaching period, and this was associated with increased personal stress (Malik, 2020).

An organization's social structure has a sensitive balance, and there is more than one component affecting this structure. Barnard (1938) defines an organization as "a system of purposefully coordinated actions or powers of two or more individuals." For organizations to achieve their quality goals, they should create structures and relationships to ensure that the individuals constituting the organization unite around a goal and concentrate on that goal (İra and Bulut, 2018).

While there have been several studies that have assessed online education and the problems faced by teachers during the online education period caused by the pandemic, there are only limited studies focusing on face-to-face education as the pandemic continues. This study focuses on the organizational commitment levels of school teachers before the COVID-19 pandemic lockdown and during the first face-to-face education period, which was initiated as a part of the normalization measures implemented in Cyprus.

LITERATURE REVIEW

Organizational Commitment

There is a consensus that organizational commitment involves a direct relationship between the employees and their organizations. However, there has been a divergence in the structure and formation of this relationship. This divergence is reflected in the existence of various definitions of organizational commitment, which has further resulted in the emergence of different definitions (Gül, 2002). Organizational commitment has been the subject of discussion in various studies for over 50 years (Allen and Meyer, 1990; Karrasch, 2013).

Organizational commitment is addressed as a three-component concept by Meyer et al. (1993). According to this model, organizational commitment is made up of three different elements: (1) emotional (affective) commitment, (2) continuity commitment, and (3) normative commitment. These components have been confirmed by different studies (Allen and Meyer, 1996). The most adopted commitment classification in literature is the one created by Allen and Meyer (1996). As per their approaches, including the three-component organizational commitment models, commitment is a psychological state (Meyer et al., 1993). This model expresses the characteristics of an employee's relationship with the organization and the signs determining the continuation of the employee's association with the organization (Güçlü, 2003). Organizational commitment can be defined as the level of an employee's embracement of the goals and norms of the organization, emotional commitment felt toward the organization, and the willingness to continue to work in that organization (Allen and Meyer, 1996).

Affective commitment occurs as a result of an individual's positive attitude toward an organization; it is the combination of the individual's work experiences, perceptions, and personal characteristics (Mowday et al., 1982). Cengiz (2002) suggests the affective commitment to be a type of commitment that includes not only complying with the general functioning of the organization within the framework of the rules determined by the organization, but also participating in all the activities of the organization sincerely to develop it, improve its existence in the best way, and make it superior against its competitors.

Continuance commitment is related to an employee's desire to stay in the organization because of the rewards gained by staying in the organization or the loss of leaving the organization (Balay, 2000; Kalay, 2015). If the person has a high continuance commitment level, it may not be necessarily related to the joy he/she draws from the job. If the continuance commitment level dominates the general commitment level, the reason can be associated with the individual benefits the individual gets due to the job (Özkalp and Kirel, 2013).

An employee feels morally obliged to stay in the organization when the normative commitment levels are high. It is suggested by Meyer and Allen (1991) that an employee feels obliged to stay in the organization due to the feeling of responsibility (Wasti, 2002).

Teachers' perceptions of the quality of the school environment affect their organizational commitment and in turn affect their job performance and the education they provide in school (Hoy and Miskel, 1987). The study by Hoy et al. (1990) suggests that affective schools are possible with teachers having high commitment levels. In addition, demographic characteristics can play a huge role in commitment levels, as suggested by Özkaya et al. (2006).

Schools globally were forced to provide online education due to the COVID-19 pandemic. During the COVID-19 online education period, teachers faced increased stress levels due to the increased scope of responsibilities (e.g., housework and unprepared online education), as suggested by Cigerci (2020) and MacIntyre et al. (2020). As per the study of Hoang (2020), teachers faced social and financial problems during the online education period.

Although several studies point out the difficulties that occurred during the online teaching period in the COVID-19 pandemic, there is no comparative study that focuses on teachers' commitment levels before and after the COVID-19 pandemic. This study aims to investigate the organizational commitment levels of teachers, in accordance with the answers provided by the teachers to quantitative questions and bring out the problems faced by them.

In particular, this study will first investigate the teachers' perception of organizational commitment and will ask if the teachers' levels of organizational commitment levels change with the gender variable, marital status, education level, self-development, job experience, and the total time spent in the same organization. The second research question will ask if the teachers' commitment levels changed as a result of COVID-19 precautions that were implemented at schools in 2020.

METHOD

Research Model and Sampling

This study aims to research the organizational commitment of teachers working in secondary schools under the North Cyprus Ministry of Education. It was carried out by using the relational screening model. A research study investigating relationships and bonds is mainly called relational screening (Büyüköztürk et al., 2008). Determining the demographic characteristics of teachers and the relationship between the changes in the commitment levels before and after a pandemic forms the main focus.

Data were collected from the survey forms shared with 300 teachers working in different educational institutions, chosen by quota sampling. The data collection took place on the Teachers Union online communication portal by communicating with a group of teachers selected on a non-proportional quota sampling basis. The method was implemented in such a way that all groups have minimum participants contributing to the survey. Online forms were delivered through the Teachers Union mail list where the data collection was carried out twice on the same group of teachers, first during the 2018–2019 education year and the other was during the post-pandemic 2021–2022 face-to-face education year. A total of 2,055 teachers working in 32 schools, consisting of 14 elementary and 18 high schools, under the Education Department of Northern Cyprus constitute the sample population of this study. The participants are about 15% of the total teacher population, which corresponds to approximately a 5% confidence interval at a 95% confidence level. In the study, 58% of the participants were women and 42% were men. About 40% of the participants had more than 16 years of experience, and 82% of the sample population was married. About 66% of the participant teachers had bachelor's degree, and the rest of the participants had master's degree as the final education level.

Study Design

Organizational commitment levels were investigated under three main components: affective, continuance, and normative. The commitment levels specific to demographic characteristics of teachers were assessed before and after the COVID-19 measures were implemented at schools. The main idea of this longitudinal study is to find the most influenced group of teachers as a result of the COVID-19 pandemic and the relative reduction in their commitment levels.

Instruments

The organizational commitment scale developed by Meyer et al. (1993), translated into Turkish by Dağli et al. (2018), was used in this study to evaluate the commitment levels of teachers. With the help of the translated version, the tool was applied to Turkish-speaking teachers for several studies. Reply options are graded using the 5-point Likert scale with the following options: "Completely agree," "Agree," "Indecisive," "Disagree," and "Completely disagree." In positive items, "Completely agree" is given 5 points, and "Completely disagree" is given 1 point. The tool uses 18 questions, where the overall minimum grading is 18, showing the lowest commitment level, and the overall maximum grade is 90, indicating the highest commitment level (considering some questions are graded in reverse format). The quantitative tool to be used in the research were applied using the online form for the teachers working in the schools chosen for the sample collection, and details are given in data collection procedures. In the first phase of the statistical study that was to be carried out in two phases, an organizational commitment was applied. Microsoft Excel Data Analysis ToolPak (Microsoft Corporation, 2018) was used to carry out the analysis. ANOVA and *t*-tests were performed to identify any relationship that is available in each demographic class. In total, two surveys were completed to collect certain demographic information. The statistical distribution of the investigated demographic information is provided in **Table 1**.

The reliability test was conducted for the applied organizational commitment survey, and Cronbach's alpha values for the post-tests were determined to be 0.802 (0.781 for affective commitment, 0.832 for continuance commitment, and 0.821 for normative commitment) for the pre-COVID period. On the other hand, post-COVID period, Cronbach's alpha values for the post-tests were found to be 0.852 (0.841 for affective commitment, 0.839 for continuance commitment, and 0.821 for normative commitment). The probability significance value (Bartlett's test) for both applications was less than 0.05, which allowed the sample to be considered in the target population. In this regard, the male-to-female ratio of gender distribution within the sample was seen to be close.

Data Collection and Analysis

Data were collected from the survey forms shared with the 300 teachers working in different educational institutions, which were chosen *via* minimum participant condition non-proportional quota sampling method. The quota sampling method is one of the non-probability sampling methods that allow the researcher

TABLE 1 | Distribution of demographic variables in the sample.

Demographic variable	Category	Participant, %
Gender	Female	58
	Male	42
Marital status	Married	82
	Single	18
Work experience	1–5 Years	15
	6–10 Years	16
	11–15 Years	29
	16+ Years	40
Time spent in same school	1–5 Years	31
	6–10 Years	15
	11–15 Years	24
	16+ Years	29
Education level	Bachelor degree	66
	Master's degree	34
Type of school	Secondary school	53
	High school	26
	College	21
Professional development	Active	47
	Passive	53

to limit the target audience in terms of certain characteristics (Cohen et al., 2008). Two simultaneous conditions were used in recruiting participants. First, the whole number of participants should constitute a minimum of 15% of all teachers currently working in the Education Department of Northern Cyprus. The participants are about 15% of the total teacher population, which corresponds to approximately a 5% confidence interval at a 95% confidence level. However, as the general sample size is small and several demographic variables exist in parallel, instead of using a random method and risking the involvement of small groups, an additional condition was utilized in the sample selection for securing the contribution of each demographic sub-group. Based on the approach, each sub-group was required to form a minimum of 15% of the sample. The data collection was carried out twice, first during the 2018–2019 education period, and the other during the post-pandemic 2021–2022 face-to-face education period. In the first section of the survey, teachers' personal information was collected. Then in the second section, the organizational commitment scale developed by Meyer et al. (1993), translated into Turkish by Dağli et al. (2018), was used. This tool is considered to be a strong tool, as it is well-suited for teachers working at schools in Turkey. Once the data collection is complete, the survey results were evaluated to check if the data are suitable for normal distribution. Skewness was found to be −0.22 before the COVID-19 period and −0.27 after the COVID-19 period. Similarly, the Kurtosis coefficient was also studied, where the coefficient was found to be 1.05 before the COVID-19 period and 0.61 after the COVID-19 period. Additionally, Kolmogorov–Smirnov test was conducted on independent test groups by using MATLAB Mathworks (2015). The significance level was considered 0.05 in the study based on the test results, and normal distribution was verified for the independent group tests. Once the data were verified, the overall average test results of demographic variables were first compared. Then *t*-tests and ANOVA tests were conducted on data where applicable to determine the significant differences between the commitment levels of groups.

FINDINGS

The results of the organizational commitment survey conducted before the COVID-19 pandemic and after the lockdown measures ended are summarized in **Table 2**. Before the COVID-19 pandemic, the mean (X) result for organizational commitment was 3.57, and after the lockdown measures ended, the mean result (X) for organizational commitment was 3.24. When the subcomponents were investigated for the pre-pandemic condition, it was seen that the highest level subcomponent was affective commitment (X: 4.18, S: 0.90), followed by continuity commitment (X: 3.47, S: 1.24) and normative commitment (X: 3.04, S: 1.42). On the other hand, a significant reduction was observed when the commitment levels were monitored following the end of the school lockdown. When compared to before the COVID-19 school lockdown period, the affective and continuance commitment subcomponents showed a reduction in mean properties. The affective subcomponent reduced by 10%, and the continuance commitment levels dropped by 18%. The change in normative commitment levels was negligible. The variance between the participant answers was higher in the post-pandemic period. This indicates a non-homogeneous influence over the demographic groups. Also, the significant difference between each subcomponent before and after pandemic conditions was investigated through *t*-tests. A significant difference at a 0.05 level was observed for the affective and continuance commitment subcomponents with change in time. When effect size was studied for both affective and continuance commitment levels, Cohen's *d*-value of 0.34 was observed for affective commitment change and 0.46 was observed for the continuance commitment change. Both results are in the range of small-to-medium effect size of practical significance.

TABLE 2 | Subcomponent commitment levels of teachers (after Meyer et al., 1993).

	Before/after COVID-19 lockdown	Mean, X	Standard deviation, S	*t*	*P**
Affective commitment	Before	4.18	0.90	1.85	0.01*
	After	3.78	1.44		
Continuance commitment	Before	3.47	1.24	2.56	0.00**
	After	2.85	1.48		
Normative commitment	Before	3.04	1.42	1.16	0.92
	After	3.08	1.28		

*$P < 0.05$, **$P < 0.01$.

In addition to the global comparison, demographic characteristics were also considered to carry out the comparison. A *t*-test was conducted for the classification with respect to gender, marital status, education level, and self-development. The results are presented in **Table 3**. In situations where the female participants' commitment levels were observed to reduce by 12%, the male participants' commitment levels were observed to only drop by 2%. When the marital status of the participants and the corresponding change in their commitment levels were studied, a slight decline was observed in the commitment levels of married teachers. However, the commitment levels of single teachers slightly increased as a result of the investigation which took place before and after the COVID-19 school lockdowns. The education level of the teachers was also monitored to influence the change in commitment levels. Although the change in commitment level was insignificant in the case of teachers with a master's degree, the teachers with a bachelor's degree showed an 18% reduction in their commitment levels.

Individual *t*-tests were applied to each demographic variable before and after pandemic conditions (**Table 3**). A significant reduction in the specific commitment levels was recorded in women due to the COVID-19 pandemic. Moreover, a significant relationship was observed in the group including the married teachers and the group consisting of teachers with bachelor's degrees before and after COVID-19 conditions. On the other hand, teachers who are male or single or hold master's degrees individually showed no significant relationship before and after COVID-19 periods.

A significant relationship was monitored for the variables, such as education level, work experience in general/experience in the same school, and between the school types. The results

TABLE 3 | *T*-test results of organizational commitment levels of teachers before and after COVID-19 lockdown.

		Mean, X	Std. Dev., S	*t*	*P**
Before	Female	3.58	0.57	1.65	0.38
	Male	3.56	0.55		
After	Female	3.16	1.23	1.58	0.07
	Male	3.48	1.12		
Before	Married	3.59	0.57	1.68	0.01*
	Single	3.40	0.44		
After	Married	3.43	0.27	0.95	0.18
	Single	3.68	0.52		
Before	Bachelor degree	3.66	0.58	1.65	0.000**
	Master's degree	3.40	0.48		
After	Bachelor degree	2.99	0.37	1.72	0.04*
	Master's degree	3.32	0.31		
Before	Active at Continuing Professional Dev.	3.60	0.50	1.97	0.45
	Passive at Continuing Professional Dev.	3.55	0.61		
After	Active at Continuing Professional Dev.	3.33	0.30	0.54	0.29
	Passive at Continuing Professional Dev.	3.21	0.57		

*$P < 0.05$, **$P < 0.01$.

with regard to the effect of job experience and its components are summarized in **Table 4**. The results showed that the highest level of commitment (X: 3.86) was found in the groups which included teachers with 1–5 years of job experience. These values decrease as the job experience increases. However, the commitment levels of teachers with 16+ years of job experience occupied second place before the COVID-19 school lockdown period. This group showed a 15% reduction in the commitment level when monitored after the COVID-19 school lockdown period.

The commitment levels of teachers were classified in accordance to the school type as the secondary school (X: 3.50) and high school (X: 3.54) teachers, and the results were found to be similar between the groups. However, the commitment levels observed for the college teachers' group were 12% higher in the pre-pandemic conditions. When the commitment levels were rechecked after the end of the COVID-19 school lockdown, a reduction of 3, 8, and 14% was observed for the high school, college, and secondary school teachers, respectively.

Individual *t*-tests were applied on before and after conditions of each demographic variable (**Table 5**). Significant relationship was recorded on female specific commitment levels reduction due to the Covid-19. Moreover, the married teachers group and teachers who hold Bachelor degree group showed significant relationship when before and after Covid-19 conditions were examined. On the other hand, teachers that is Male or Single or holds Master's Degree individually showed no significant relationship with the before and after Covid-19 periods.

A *post-hoc* test was conducted for the variables to identify which category showed significant differences among groups of teachers with experience, being in the same school, and school type. When the test was conducted both before and after the COVID-19 periods, the trends of significant difference mostly remained the same among the groups. **Table 6** summarizes the results of the *post-hoc* study where specific analysis was conducted on individual groups. Based on the *post-hoc* analysis,

TABLE 4 | ANOVA test results.

			Mean, X	Std. Dev., S	*F*	*P**
Work experience	Before	1–5 Years	3.86	0.40	2.92	0.03*
		6–10 Years	3.58	0.31		
		11–15 Years	3.48	0.49		
		16+ Years	3.58	0.62		
	After	1–5 Years	3.81	0.49	8.56	0.005**
		6–10 Years	3.62	0.35		
		11–15 Years	3.36	0.42		
		16+ Years	3.06	0.72		
Time spent in same school	Before	1–5 Years	3.46	0.46	6.05	0.000**
		6–10 Years	3.70	0.45		
		11–15 Years	3.44	0.62		
		16+ Years	3.74	0.59		
	After	1–5 Years	3.42	0.50	9.66	0.000**
		6–10 Years	3.54	0.33		
		11–15 Years	2.98	0.37		
		16+ Years	2.89	0.68		
School type	Before	Secondary school	3.50	0.57	11.05	0.000**
		High school	3.54	0.47		
		College	3.92	0.53		
	After	Secondary school	3.01	0.41	3.45	0.04*
		High school	3.43	0.38		
		College	3.62	0.37		

*$P < 0.05$, **$P < 0.01$.

the significant difference was noticed only in those groups where the difference in experience years was more than 5 years. Furthermore, when the time spent in the same institution was investigated, a significant difference was observed between the groups having an experience of less and greater than 10 years. Finally, when school types were investigated, a significant difference was only observed between the college teachers and secondary school teachers during the post-COVID-19 period. On the other hand, a significant difference exists for any combination with secondary school teachers before the COVID-19 period.

The Pearson's R correlation study was also carried out on the subcomponents of commitment, and the results are presented in **Table 7**. Results show no strong level of relationship between the subcomponents during the pre- and post-COVID periods. On the other hand, while obtaining no significant relationship when repeating the analysis between commitment subcomponents for the pre-COVID period, a medium-level relationship between affective and continuance subcomponents was observed for the post-COVID period. Although no positive strong relationship was found between the affective and normative subcomponents in the pre-COVID period, the negative correlation properties were replaced with positive values in the post-COVID period.

DISCUSSION

COVID-19 influenced the field of education in various aspects. Recently, several studies were conducted to highlight the

TABLE 5 | Individual *t*-tests on demographic characteristics before and after COVID-19 pandemic conditions.

	Male	Female	Single	Married	Bachelor degree level	Masters degree level	Active at Continuing Professional Dev.	Passive at Continuing Professional Dev.
t	1.55	1.43	1.56	1.65	1.78	1.98	1.58	1.52
P	0.25	0.000**	0.15	0.015*	0.000**	0.09	0.10	0.06

*$P < 0.05$, **$P < 0.01$.

TABLE 6 | *Post-hoc t*-test results.

		Work experience (years)					
		1–5 vs. 6–10	1–5 vs. 11–15	1–5 vs. 16 +	6–10 vs. 11–15	6–10 vs. 16+	11–15 vs. 16+
Before	*t*	3.21	3.12	3.52	3.55	3.62	3.75
	P	0.09	0.01*	0.00*	0.06	0.04*	0.05*
After	*t*	2.02	2.02	2.02	2.02	2.02	2.02
	P	0.08	0.00*	0.00*	0.08	0.01*	0.22
		Time spent in the same school (years)					
		1–5 vs. 6–10	1–5 vs. 11–15	1–5 vs. 16+	6–10 vs. 11–15	6–10 vs. 16+	11–15 vs. 16+
Before	*t*	2.05	2.13	2.15	2.35	2.85	2.32
	P	0.18	0.01*	0.00*	0.00*	0.00*	0.06
After	*t*	2.02	2.02	2.02	2.01	2.05	2.04
	P	0.20	0.03*	0.01*	0.00*	0.00*	0.23
		School type					
		Secondary vs. High school	Secondary vs. College	High school vs. College			
Before	*t*	2.12	2.21	2.22			
	P	0.02*	0.01*	0.82			
After	*t*	2.09	2.09	2.14			
	P	0.10	0.04*	0.67			

*$P < 0.05$, **$P < 0.01$.

difficulties that the teachers faced during the COVID-19 school lockdown. This study assessed the relative changes in the organizational commitment levels of teachers before and after the COVID-19 school lockdown. Based on the studied parameters, there is an overall decrease in the commitment levels of teachers after the COVID-19 school lockdown. As suggested by Choi and Tang (2009), the commitment levels of teachers may change with a change in time. In this study, the relative decrease was observed in several parameters, such as demographics, education, and experience levels. Based on the answers of the teachers classified in accordance to the "time worked at the same school," it was observed that the highest commitment was noticed in the 16+ years of experience group before the advent of pandemic conditions. These results are in line with the study of Collie et al. (2011). As per the respective study, a gradual increase in the commitment levels of teachers is expected with an increase in their experience. However, when the post-lockdown conditions were studied, the commitment levels dropped significantly in the group of teachers who had spent more than 10 years at the same school. In other words, the trend is now in the reverse direction. The negative impact of this trend can be associated with the feeling of discomfort among the experienced teachers (belonging to the higher risk group by age), as they are under the perception that the COVID-19 pandemic is still pernicious. Unlike the studies conducted in Turkey (Selvitopu and Şahin, 2013), this study on Turkish Cypriot teachers showed that the teachers with 16+ years of job experience occupied second place, showing that there is a decrease in the commitment levels of the teacher group with 5–16 years of job experience in the pre-COVID period. Brimeyer et al. (2010) suggest the more experience the worker has, the greater the organizational commitment levels. The idea

TABLE 7 | Pearson's R correlation test results.

		Affective	Continuance	Normative
Before	Affective	1.00		
	Continuance	0.34	1.00	
	Normative	−0.20	0.26	1.00
After	Affective	1.00		
	Continuance	0.45	1.00	
	Normative	0.31	0.11	1.00

comes from the high levels of autonomy of the experienced teachers and the greater control at the point of production. However, this was not true in the post-COVID period, where old and experienced teachers had only limited experience in online teaching portals.

The groups were evaluated in terms of the subcomponents of organizational commitment based on marital status, education level, job experience, and service time in the same school and school type. The COVID-19 pandemic has caused changes in several known facts and social characteristics of people. This study attempted to investigate the impact of COVID-19 school lockdown on the commitment levels of teachers. In general, the findings show that the commitment levels of teachers dropped in the range of 5–25%. The drop in commitment levels was more prominent in the female teachers when compared to the male teachers. Interestingly, the commitment levels of single teachers slightly increased. As suggested by MacIntyre et al. (2020), married teachers saw an increase in their responsibilities during the pandemic (e.g., simultaneous education with kids at home), which resulted in them having increased stress levels.

In general, the normative commitment levels of teachers were not significantly affected. However, their affective and continuance commitment levels dropped. Some teachers were reported to have retired early in order to avoid face-to-face teaching during the pandemic. Wei et al. (2021) suggest a reduction in the commitment levels of teachers due to the measures taken on teachers, such as salary reduction and changes in the work environment. Each demographic group showed a reduction in the commitment levels of teachers with a different pattern. Groups that showed significant differences were highlighted as a part of this study. However, due to the limitations of this study, no further reasoning could be carried out.

Furthermore, the effects of the pandemic on the commitment levels of teachers were different for different groups. COVID-19 pandemic resulted in the utilization of technology for education. Globally, teachers were forced to use digital tools to teach without any initial preparation. While some groups of teachers easily adapted to online teaching, some did not. The online education practice/wide range of teaching tools was usually utilized during the pursuit of a master's degree. The individuals with a master's degree showed a relatively less reduction in their commitment levels in comparison to those who only had an undergraduate degree. A reason for this finding can be due to the initial preparedness among the individuals owing to their educational background. Another reason for the global reduction in the commitment levels of teachers can be the discontinuation of online teaching platforms. Significant efforts were put by the teachers into these online teaching tools, and suddenly, all the efforts were abandoned. According to the study of Zhu and Liu (2020), the platforms for online teaching should evolve with the users, and they should be utilized for prolonged periods, even after the end of the pandemic. Unal and Bulunuz (2020) observed teachers demanding the online teaching platforms to remain parallel with face-to-face teaching in the post-lockdown period. However, a majority of schools worldwide have put an end to online teaching platforms since the start of face-to-face teaching. The same situation also applies to the schools where this study was applied to teachers.

The investigation done specifically on the school type showed disaggregation of teachers in terms of their commitment levels. Secondary school teachers showed the maximum drop in commitment levels as part of the transition. This can be linked to the difficulties that arise when younger students were asked to follow the COVID-19 measures (e.g., social distancing and wearing a mask). The stress levels of teachers may have an influence on their commitment levels, and this aspect should be extensively studied to develop a better understanding. *Post-hoc* analysis in this study also supports the idea that secondary school teachers show significant differences in commitment levels when compared to other teachers.

CONCLUSION AND RECOMMENDATIONS

This study was carried out to investigate the effects of two variables on the organizational commitment of teachers working in secondary educational institutions before and after the COVID-19 school lockdown in Cyprus. A quantitative methodology was employed in this study. In this quantitative study, an evaluation based on the demographics of the participants was carried out. In general, the pandemic resulted in an overall reduction in the commitment levels. Continuance commitment was the most influenced subcomponent, as its level reduced by 18%, followed by affective commitment, which saw a 10% drop. The reduction in normative commitment was negligible. When the demographic results were investigated, it was observed that gender differences had no significant effect on the results. However, a relative reduction in the commitment levels was observed. While it was initially determined that the commitment levels of married teachers were higher than those of single individuals, the post-pandemic results showed the opposite results. Postgraduate education had a positive impact on the post-lockdown commitment levels of teachers. Also, college teachers were observed to have the least reduction in commitment levels, while secondary school teachers were observed to have the highest reduction in commitment levels. Finally, having analyzed the time spent by teachers in the same school, it was found that, as the time spent in the same school increased, the commitment level also increased during the pre-pandemic lockdown period. However, this trend reversed during the post-pandemic lockdown period, where the commitment level of teachers decreased with the increase in the time spent in the same school. It is believed that this research will contribute to future studies on the organizational commitment of teachers, especially in the post-pandemic era.

As a result of the iterative model research, the recommendations presented below are expected to have a positive effect on the sustainable commitment levels of teachers.

1. The study was limited to a forced-choice response questionnaire and included a quantitative investigation. It is suggested that future studies should incorporate qualitative methods of data collection, so that the specific issues can be monitored thereon.

2. During the early times of the post-school lockdown period, teachers faced several situations that might have influenced their commitment levels. Studying these environmental factors in terms of demographic scale will allow decision-makers to improve the commitment levels of teachers at the level of specific groups.
3. Research should be carried out on the factors that keep the commitment levels of college teachers at good levels, and these methods should be modified such that they can be used for other school types to increase the commitment levels of teachers.
4. As the job experience of the teachers generally increased, a decrease in commitment level was observed. Also, as the time spent by the teachers in the same school increased, a positive effect was recorded. Planning job rotations or allowing elder teachers to carry out distance teaching may have a positive effect on the commitment levels.
5. The study revealed that the teachers who hold only a bachelor's degree have a significant reduction in their commitment levels as a result of the implementation of COVID 19 precautions at schools. Further study options may have a positive impact on the commitment levels of teachers.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

This study was initially assessed and approved by European University of Lefke, Ethics Committee prior to the application of the survey on teachers. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

IA performed the initial analyses and wrote the manuscript. OS assisted in the data collection and data analysis. Both authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.810015/full#supplementary-material

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BRIEF RESEARCH REPORT
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The Effects of ARCS Motivational Instruction in Physical Education on Learning Cognition and the Health-Related Physical Fitness of Students

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The environment in metropolitan regions along with other factors such as changes in lifestyle and academic pressure can result in students reducing the time they spend pursuing outdoor activities. An increase in sedentary lifestyles and lack of physical activity seriously threaten the health of students, due to reduced physical fitness. To solve this issue, cultivating exercise habits should commence from childhood. Physical education in schools is the best time to cultivate the development of a wholesome body and mind in students. Students need to have high flexibility, strong learning ability, and regular exercise in schools for their future physical and mental development, the establishment of an exercise regimen, and the cultivation of motor skills. For this study, university students in Sichuan Province were chosen as research samples, and 500 copies of a questionnaire were distributed among them. After removing invalid and incomplete questionnaires, 375 were deemed valid, a retrieval rate of 75%. The research results demonstrated significant positive correlations between (1) the Attention, Relevance, Confidence, and Satisfaction (ARCS) motivational instruction in physical education and learning cognition, (2) learning cognition and health-related physical fitness, and (3) ARCS motivational instruction in physical education and health-related physical fitness. The study results suggest that a good exercise regimen boosts students' self-confidence, increases their motivation to participate in physical activities, enhances their health-related physical fitness, and cultivates habits to engage in lifelong physical activity.

Keywords: ARCS motivation model, instruction in physical education, learning cognition, health related physical fitness, value component

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INTRODUCTION

The World Health Organization (WHO) cautions that inadequate physical activity is the fourth major hazard to global mortality. Annually, more than 2 million human deaths worldwide are related to insufficient physical activity. The proportion of the population with inadequate physical activity is increasing in many countries (Bechter et al., 2021). Barring sportspersons in various

countries, exercise is often not a priority. Competition is fierce in the workplace, and only those who work fast and perform better at work stand out in this competitive environment. This results in a lack of physical movement (Wu et al., 2022). The environment in metropolitan regions, changes in lifestyle, and effects of academic pressure result in students largely reducing their time for outdoor activity after school. Besides, an increase in sedentary lifestyles and lack of physical activity have become primary threats to students' health, resulting in a marked decline in their physical fitness (Tong et al., 2021). Therefore, physical education (PE) in schools should prepare students to adapt to modern life, understand their bodies, and cultivate health management habits (Wu et al., 2021). The inculcation of good health and physical fitness behaviors in students should be the primary objective of health and physical education instructions (Li et al., 2021).

Advances in technology and changes in lifestyle have decreased physical activity and exercise in students, resulting in poor physical fitness and abnormal body postures (Batistič et al., 2021). In addition to an unbalanced diet, preferences for high-calorie food and insufficient exercise are the factors contributing to childhood obesity. Good exercise habits in adults start during childhood. Physical education in schools plays a crucial role in cultivating a wholesome body and mind in students. The exercise regimen at schools, particularly for flexibility and stamina, deeply impacts future physical and mental development in students along with an understanding of the need to exercise, the formation of exercise habits, and the cultivation of motor skills. The development of exercise habits during the student phase is critical; the cultivation of regular exercise habits from childhood could enhance development, promote health and physical fitness, and ensure they continue to exercise after growing up. Physical education in schools, therefore, is important. It becomes important for PE teachers in schools to make their students see exercise as fun, which also facilitates health-related physical fitness and enhances their quality of life. There are advantages to traditional teaching models that future education reforms should take into account while making improvements. While providing physical education instructions it is necessary to observe the students' learning effectiveness in physical fitness courses (Wu et al., 2020a). The curriculum design should present exercise as fun to continue motivating students' physical activities, provide development and learning opportunities, allow students to enjoy the learning process, and maintain good physical fitness standards. Motivation is also an important indicator of individual learning efficiency (Small and Gluck, 1994). The ARCS motivation model, which refers to Attention, Relevance, Confidence, and Satisfaction, is a systematic teaching method with an instructional design model to motivate students' continuous learning needs. The model is based on motivation theory and is practical (Keller, 1983). Zhu and Burrow (2022) maintained that ARCS could reinforce systematic instructional design to encourage learners' participation and interaction. Additionally, this model provides a theoretical basis and practical application. In addition to the viewpoint of behaviorism, the theoretical foundation also emphasizes individual cognition, expectation, and value. The ARCS model also aligns with the contemporary educational thought of openness, freedom, and personal value. For these reasons, the impact of ARCS motivational instruction in physical education on students' learning cognition and health-related physical fitness are discussed in this study. The study also aimed to explore how the ARCS model can help students acquire successful experience in exercise, build their self-confidence, increase their motivation to participate in physical activity, enhance their health-related physical fitness, and cultivate lifelong habits in students to engage in physical activity.

LITERATURE REVIEW AND HYPOTHESIS

Chin et al. (2018) mention four factors in the ARCS motivation model that closely impact teaching. When teachers have to include the ARCS model in their teaching to develop a benign loop in the students' learning cognition; the lack of any part was said to reduce the entire learning cognition effect. Chang and Hwang (2018) pointed out Keller's emphasis on the diagnostic nature and prescriptive function of ARCS. They explained that instructors can provide systematic instructional strategies to compensate for insufficient motivation and improve learning cognition of students who lack these four conditions. Wu (2018) argued that teachers should understand and use strategies such as the ARCS model in their instructional design to develop and produce materials that attract students and motivate them to learn, as it is the key factor in determining teaching success and students' learning cognition outcome. Accordingly, the following hypotheses were tested in this study.

H1: ARCS motivational instruction in physical education has significant correlations with learning cognition.
H1-0: ARCS motivational instruction in physical education negatively correlates with learning cognition.
H1-1: ARCS motivational instruction in physical education positively correlates with learning cognition.

Lin et al. (2018) studied the effectiveness and relationship between motor skill learning and learners' motivations (ARCS learning motivation) in information integrated instruction in physical education for pupils. An experimental group showed a significant positive correlation between learning cognition and motor skill learning. Learning cognition presented the strongest predictability of motor skill learning (Wu et al., 2020b). Similarly, Chen and Lin (2018) studied the effects of the ARCS motivation model on G3 pupils' motor skills, health-related physical fitness, and learning cognition and found significant positive correlations between the experimental group's learning cognition and their motor skills, health-related physical fitness, attention, relevance cognition, self-confidence, and satisfaction. With the intervention of the ARCS motivation model, Deublein et al. (2018) found that students in the experimental group and the control group appeared to have notable differences in overall learning motivation, attention, learning cognition, self-confidence, and satisfaction in learning motivation as well as significant differences on overall skill learning effect

and health-related physical fitness. Accordingly, the following hypothesis was tested in this study.

H2: Learning cognition has significant correlations with health-related physical fitness.
H2-0: Learning cognition has significant negative correlations with health-related physical fitness.
H2-1: Learning cognition has significant positive correlations with health-related physical fitness.

Chen et al. (2018) studied the effect of exercise duration on elementary school pupils' health-related physical fitness. They discovered that increasing the teaching hours for PE had a significant impact on students' cardiorespiratory capacity, flexibility, muscle strength, and muscular endurance in health-related physical fitness. In research on the effect of walk-run activity on elementary school pupils' health-related physical fitness, Ibáñez and Delgado-Kloos (2018) discovered that the activity could enhance the students' physical fitness, and female students showed remarkable differences in more items than male students did. Li and Keller (2018) studied the impact of different types of new-style calisthenics training on elementary school children's health-related physical fitness. The results showed that students who trained in new-style calisthenics made noticeable progress on health-related physical fitness, especially in the 800-m walk run; male and female students who trained three times per week showed notable progress on the 1-min bent-knee sit-up and 800-m walk-run. Therefore, it was suggested that training three times per week was best for enhancing elementary school children's physical fitness. Accordingly, the following hypothesis was established in this study.

H3: ARCS motivational instruction in physical education has significant correlations with health-related physical fitness.
H3-0: ARCS motivational instruction in physical education has significant negative correlations with health-related physical fitness.
H3-1: ARCS motivational instruction in physical education has significant positive correlations with health-related physical fitness.

METHODOLOGY

Conceptual Structure of This Study

Summing up the above literature review, the conceptual structure of the research (**Figure 1**) lays out the relationship between ARCS motivational instruction in physical education, learning cognition, and health-related physical fitness.

Operational Definition

(1) ARCS motivational instruction in physical education

Referring to Hong et al. (2019), ARCS motivational instruction contains four dimensions.

1. Attention: Inducing interest in students and sustaining their attention are the first priorities in this model. Capturing students' attention is the first element of learning.
2. Relevance: The second element of the model is to make the students realize that what they are learning is relevant. The design needs to be customized to the students' characteristics, knowledge, and cultural background to enhance students' interests in learning.
3. Confidence: Confidence involves an individual's belief in completing their work. When students believe that they can successfully learn new courses or complete new work, it demonstrates higher learning motivation.
4. Satisfaction: Satisfaction is students' evaluation of the learning results. Personal satisfaction is a key factor in remaining motivated.

(2) Learning cognition

Based on the study by Sung et al. (2019), three cognition components of value, expectancy, and affection have been adopted in this study to determine students' learning process.

1. Value component: students' perceived importance, value, and belief in the learning activity.
2. Expectancy component: students' belief in their ability to learn and the expectation to achieve learning.
3. Affective component: feelings and emotional responses of students to their personal ability to learn and the result.

(3) Health-related physical fitness

Referring to Kao et al. (2019), health-related physical fitness in this study contains four dimensions.

1. Body composition: It refers to the ratio or content of various structural components in the body.
2. Cardiorespiratory capacity: It refers to the ability of the heart to transmit blood and oxygen to the entire body.
3. Muscle strength and muscular endurance: Muscle strength refers to the ability of muscles or muscle groups to develop the maximal strength to withstand resistance within a total activity.
4. Flexibility: It refers to the maximal range of activity, i.e., the activity range of joints and periarticular ligaments and muscle extension abilities.

Research Sample

Five hundred copies of the questionnaire were distributed among college students in Sichuan Province who served as the research sample. After removing invalid and incomplete copies, 375 responses were deemed valid, with a valid retrieval rate of 75%.

RESULTS

Factor Analysis

The results of the factor analysis are shown in **Table 1**. The factor analysis of the scale of ARCS motivational instruction in physical education extracted the following four factors: "attention" (eigenvalue = 2.755, $\alpha = 0.82$), "relevance" (eigenvalue = 2.163, $\alpha = 0.88$), "confidence" (eigenvalue = 1.836, $\alpha = 0.83$), and "satisfaction" (eigenvalue = 1.442, $\alpha = 0.80$). The cumulative covariance was 71.694%. The factor analysis for learning cognition scale extracted the following three factors:

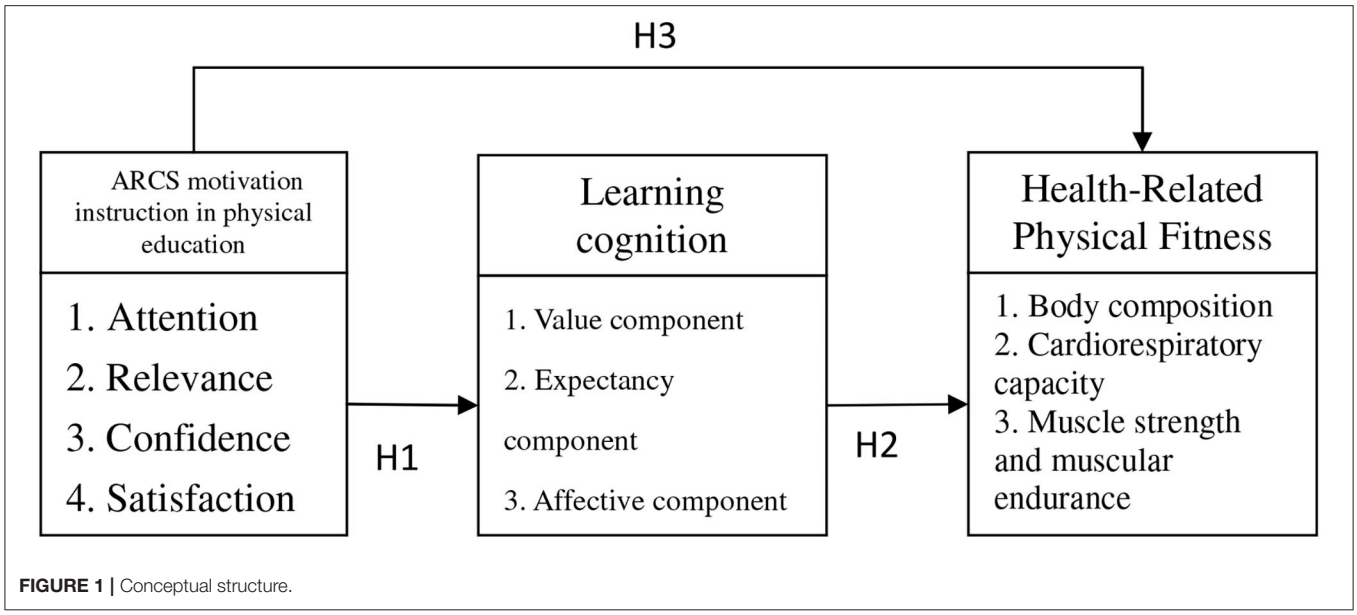

FIGURE 1 | Conceptual structure.

TABLE 1 | Factor analysis.

Variable	Dimension	Eigenvalue	α	Cumulative variance explained
ARCS motivational instruction in physical education	Attention	2.755	0.82	71.694
	Relevance	2.163	0.88	
	Confidence	1.836	0.83	
	Satisfaction	1.442	0.80	
Learning cognition	value component	3.623	0.84	73.281
	Expectancy component	2.514	0.86	
	Affective component	2.287	0.85	

TABLE 2 | Correlation analysis.

Research dimension	α	ARCS motivational instruction in physical education	Learning cognition	Health-related physical fitness
ARCS motivational instruction in physical education	0.84			
Learning cognition	0.85	0.26**		
Health-related physical fitness	0.92	0.31**	0.23**	

**Stands for $p < 0.01$.

"value component" (eigenvalue = 3.623, α = 0.84), "expectancy component" (eigenvalue = 2.514, α = 0.86), and "affective component" (eigenvalue = 2.287, α = 0.85). The cumulative covariance was 73.281%.

Correlation Analysis

Table 2 shows notable correlations between ARCS motivational instruction in physical education, learning cognition, and health-related physical fitness. These results support H1, H2, and H3.

LISREL Evaluation Indicator

Linear structural relation (LISREL) combines factor analysis and path analysis in traditional statistics and adds simultaneous equations in econometrics. It is a research tool to calculate multiple factors and multiple casual paths simultaneously. The goodness-of-fit of the model could be evaluated from preliminary fit criteria, overall model fit, and fit of the internal structure of the model.

The research results are organized as below. The preliminary fit, internal fit, and overall fit of the model are explained.

From the complete model analysis results, as shown in **Table 3**, four factors in ARCS motivational instruction in physical education (attention, relevance, confidence, and satisfaction) significantly explain ARCS motivational instruction in physical education ($t > 1.96$, $p < 0.05$); three factors in learning cognition (value component, expectancy component, and affective component) remarkably explain learning cognition ($t > 1.96$, $p < 0.05$); four factors in health-related physical fitness (body composition, cardiorespiratory capacity, muscle strength, and muscular endurance, and flexibility) notably explain health-related physical fitness ($t > 1.96$, $p < 0.05$). Therefore, the overall research model shows a good preliminary fit.

In terms of internal fit, ARCS motivational instruction in physical education reveals positive and significant correlations with learning cognition (0.342, $p < 0.01$). Learning cognition

TABLE 3 | Overall linear structural model analysis result.

Evaluation item	Parameter/evaluation standard		Result
Preliminary fit	ARCS motivational instruction in physical education	Attention	0.726**
		Relevance	0.738**
		Confidence	0.750**
		Satisfaction	0.707*
	Learning cognition	Value component	0.746**
		Expectancy component	0.718*
		Affective component	0.763**
	Health-related physical fitness	Body composition	0.755**
		Cardiorespiratory capacity	0.783**
		Muscle strength and muscular endurance	0.777**
		Flexibility	0.769**

***Stands for $p < 0.01$, * Stands for $p < 0.05$.*

appears positive and has remarkable correlations with health-related physical fitness (0.296, $p < 0.01$). In addition, ARCS motivational instruction in physical education shows positive correlations with health-related physical fitness (0.388, $p < 0.01$). H1, H2, and H3 are therefore supported.

Regarding the overall model fit, the overall model fit standards, $\chi^2/\mathrm{Df} = 1.763$, which is smaller than standard 3 and RMR is 0.006, show proper results of χ^2/DF and RMR. Furthermore, the chi-square test is sensitive to sample size and it is not suitable for directly judging the fit. However, the overall model fit standards, GFI = 0.987 and AGFI = 0.944, are higher than the standard 0.9 (the closer GFI and AGFI to 1 revealing the better model fit). This model, therefore, presents better goodness-of-fit.

DISCUSSION

The ARCS motivation model can match various subjects and materials to develop distinct teaching strategies for promoting learning motivation. Many studies affirm that applying the ARCS motivation model to subject teaching in different fields presents a positive value to the teaching and learning environment, either as guidance or the development of teaching strategies. For instruction in physical education, the students' attention is first captured according to the ARCS motivation model. Their curiosity about the curriculum is aroused by asking questions so that students are fully involved in the learning activity and get confident in completing their learning. With intrinsic and extrinsic encouragement, the learning desire and self-satisfaction are sustained. In other words, it is expected that students experience fun and comfort, are inspired by exercise, and present good physical fitness through PE in schools. By reinforcing positive ideas about sports, the students are prompted to keep exercising and encourage the sports culture. ARCS motivational instruction in physical education could enhance students' learning cognition in terms of attention, relevance, confidence, and satisfaction to further promote learning effectiveness (Harlen and Crick, 2003) as well as improve body mass index, flexibility, muscle strength, and muscular endurance, and cardiorespiratory capacity in students' health-related physical fitness (Ryan and Deci, 2000). Exercise has significant positive effects on flexibility, muscle strength and muscular endurance, and cardiorespiratory capacity (Ormrod, 2003), especially abdominal muscle strength and muscular endurance, which is important to maintain body posture. With bad abdominal muscle strength and muscular endurance, the pelvis would not be suspended in a normal position and might appear tilted, further affecting health. Good muscle strength and muscular endurance strengthen the ligaments and tendons and reduce fatigue or injury during physical activity (Stipek, 1995). For this reason, the promotion of a good sports atmosphere and the design of physical activity, as well as the intervention of physical fitness games, could make physical education fun and lively to spark students' learning interests and active learning of various motor skills. As a result, students could cultivate the good habit of lifelong exercise. It is the urgent responsibility of PE teachers. The research results confirm that ARCS motivational instruction in physical education could effectively promote students' learning cognition and health-related physical fitness, capture students' attention in PE, establish relevant cognition, and build self-confidence and self-satisfaction. ARCS motivational instruction in physical education could also enhance students' body mass index. When activity time and frequency are increased in the future, the effect might be more obvious.

CONCLUSION

Learning motivation promotes learning behavior and explains why an individual is willing to sacrifice other activities to participate in certain activities. Inducing motivation in students is the first step in the teaching process, which enables students to show interest and induce existing knowledge, and prepares them to learn new things. Teachers urgently need skills and strategies to enhance students' learning motivation in current teaching sites. It is an important factor for success in teaching and students' learning outcomes. Mandigo and Corlett (2010) point out that the instructional objectives of the PE curriculum are for students to learn correct sports concepts and motion skills and cultivate the habit of lifelong sports and a healthy body and mind. However, a high level of learning motivation is essential for students' continuous learning in PE to achieve learning objectives. Students, therefore, acquire learning satisfaction and experience in PE courses by participating in PE classes and PE-related activities. This reinforces their intrinsic learning motivation by enjoying such a special experience (Kirk and Kinchin, 2003). By stressing teaching activity, building a good learning atmosphere, and utilizing complete equipment and facilities to create a quality learning environment, PE teachers could enhance students' learning effectiveness and

self-confidence while establishing the effectiveness of promotion and development of the instruction (Taplin, 2019).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics Committee of the Sichuan University. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

XL performed the initial analyses and wrote the manuscript. LL and JL assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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BRIEF RESEARCH REPORT
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Effects of Online Cooperative Learning on Students' Problem-Solving Ability and Learning Satisfaction

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As technology changes, it is becoming more common in education for students to acquire knowledge from sources other than just their teachers. In the face of a diverse student background, teachers have to make adjustments in their instruction so that students do not simply listen. Student-based educational philosophy aims to combine instructional methods with cooperative learning to allow students to change from passive learning to active knowledge construction, reinduce students' learning motivation and passion, and enhance students' self-learning effectiveness. Focusing on college students in Fujian Province as the research sample, 360 copies of a questionnaire were distributed for this study. After deducting invalid and incomplete ones, 298 copies remained, with a retrieval rate 83%. The research results showed significantly positive correlations between online cooperative learning and problem-solving ability, problem-solving ability and learning satisfaction, and online cooperative learning and learning satisfaction. According to the results, it is expected, in the digital era, to integrate information technology into the teaching environment and focus on learning objectives to create teaching software with a user-friendly interface, simple operation, learning process recording, and an interactive learning community in the teaching-learning process to develop the characteristics and effectiveness of digital teaching and learning.

Keywords: information technology, online cooperative learning, problem-solving ability, learning satisfaction, social skills

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INTRODUCTION

As times progress and technology improves, teachers are no longer the only channel for students acquiring knowledge. Students in this generation are stimulated by distinct and diverse cultures to show more active and flexible characters or responses than students before them, and are even brave enough to challenge existing values. Students in a traditional learning model with passive lectures will not concentrate in the classroom. Examinations have been a core part of education for a long time. It is the best time to practice cooperative learning. The curricula show that the ideas such as taking the initiative, engaging in the public, and seeking the common good are important. Engaging in the public and seeking the common good is a result of the characters of

positive independence and face-to-face fostering of interactive and interpersonal skills mentioned in cooperative learning. In this respect, it can be stated that cooperative learning guides students to be well and develops various interactive abilities with ego, others, society, and nature. It also helps students in applying and practicing their knowledge, experiencing the meaning of life, being willing to devote to the sustainable development of society, nature, and culture, and seeking reciprocity of each other and common good. Information technologies are material tools that learners should actively and broadly apply to a the positive interaction channel between oneself and the environment to effectively engage the public with others and the environment (Li et al., 2021).

In the face of diverse student background, teachers have to make adjustments in their instruction to stop students from simply listening. Educational philosophy should be student-based to promote each student's thinking. In this case, cooperative learning allows students to change from passive learning into active knowledge construction, could reinduce students' learning motivation and passion, and enhance students' self-learning effectiveness. Most students are digital natives born after 1980, while most of their teachers are digital immigrants and even "digital refugees" escaping from technologies and being afraid of new knowledge. The overlap between such two generations is limited, meaning that their values and morality are distinct. Modern students are digital natives able to use mobile phones, televisions, computers, laptops, and tablets since childhood, and highly dependent on new technologies. Information-technology-integrated instruction with multimedia equipment and materials means teaching and learning is no longer restricted to dictation and paper-and-pencil (Vaz et al., 2021); the class climate has changed to cooperative learning. The operation of cooperative learning is smoother through information technology, and a communication and interaction bridge can be built through information technology so that cooperative learning could cultivate students' problem-solving ability to further promote learning satisfaction. As a result, the effects of online cooperative learning on students' problem-solving ability and learning satisfaction are discussed in this study, expecting to integrate information technology into the teaching environment in the digital era, focus on learning objectives based on learning theory, have teaching software with a user-friendly interface, simple operation, learning process recording, and an interactive learning community in the teaching-learning process to develop the characteristics and effectiveness of digital teaching and learning.

LITERATURE REVIEW AND HYPOTHESIS

Constructivists regard gaining knowledge as a comprehensive and reflective thinking activity through students' independent exploration and observation and highly praise learner-centered learning environments. Teachers' roles of propagating the doctrine, imparting professional knowledge, and resolving doubts change into knowledge building facilitators. The superordinate-subordinate relationship of "Learning from Teacher" is changed into the equal relationship of "Learning with Teacher." The learning perspective of constructivism facilitates the development of current learning technology (Cortez et al., 2021).

Dozens of instructional strategies are developed for cooperative learning, and each grouping method presents the characteristics and applicable teaching situation. Teachers could flexibly apply the difference according to instructional objectives, student characteristics, and course attributes. Researchers, in the interview with collaborative teachers, also reveal not being restricted into a grouping method, but extracting the advantages of various methods, and making flexible adjustments in consideration of teachers' personality traits and class attributes and characteristics (Akdemir et al., 2020). Major cooperative learning strategies are classified into three types, including one suitable for leading sharing and discussion among students, another for assisting students in mastering learning content, and the last for leading teams for theme-based inquiry. Each type shows various strategies to cope with different teaching styles, or more than two strategies could be changed and applied depending on the demands (Hafeez, 2021).

Li and Keller (2018) mentioned the significant effects of using web problem-based cooperative learning and on the problem-solving skills of the children. The results revealed the better performance of students compared to traditional problem-based learning. Del Gaudio et al. (2021) used online cooperative learning to discover the advantages and strengths, solve problems according to collaborative interaction, comprehend the roles, integrate the discussed ideas, clearly master the tasks, coordinate the allocation of team members' reports, complete reports according to previous discussion results, discuss and modify successive measures together, inspect cooperation results, track back problem-solving processes, and reflect team organization and roles, problem-solving ability as to independently complete tasks with high-level thinking, and cooperative problem-solving ability as to create the value of synergy, solve problems and complete tasks together, and create good performance beyond the expectation (Wu et al., 2019, 2022). Ingrid (2019) explained that independent thinking and analysis ability allowed dealing with daily life and even life problems. Teachers applying information technology to cooperative learning to enrich students' life experience, being good at asking questions, creating problem-solving teaching situations, applying technological tools to speculate and deduce problems, effectively solving problems with cooperative discussions, and enhancing adaptability to life could help students become problem-solving experts. For this reason, the following hypothesis is established in this study.

H1: Online cooperative learning presents significantly positive correlations with problem-solving ability.
H1-1: Online cooperative learning shows significantly positive correlations with problem-solving ability.
H1-2: Online cooperative learning reveals remarkably negative correlations with problems-solving ability.

Oates and Ritók (2018) explained that learners being able to effectively enhance their problem-solving ability after going through the curriculum arranged by the school, course content of teachers, and effective promotion of knowledge acquisition in the learning process, with consistent expectation and anticipation, would appear satisfactory; on the contrary,

dissatisfaction would be delivered. Metin-Orta and Demirtepe-Saygılı (2021) stated that education aimed to help individuals live their life; in real situations, an individual using critical thinking to solve complicated and messy dilemmas and problems was the core task of modern education. Teachers in the teaching process did not simply transmit knowledge, provide guidance for study, and dispel confusion, but had to help students associate old experience with new knowledge to further solve problems through tight cognition structure to form meaningful learning in order to effectively enhance learning satisfaction. Wu et al. (2021) regarded cooperative problem-solving ability as an individual with sufficient ability communicating and dialoging with more than two companions to share knowledge and skills, collaboratively and effectively participate in an activity, and develop teamwork ability to solve problems. Collaborative problem solving referred to several partners collaboratively completing a task where each partner had to positively participate (Chiao and MacVaugh, 2021; Min et al., 2021), mutually coordinate, and pull together to solve problems in the task with teamwork so as to effectively enhance learning satisfaction. Accordingly, the following hypothesis is establishment in this study.

H2: Problem-solving ability shows remarkably positive correlations with learning satisfaction.
H2-1: Problem-solving ability appears to have notably positive correlations with learning satisfaction.
H2-2: Problem-solving ability presents significantly negative correlations with learning satisfaction.

Wu et al. (2020) applied interactive APP to analyze learning satisfaction with idiom teaching; the students, regardless of gender and learning achievement, were satisfied with the use of interactive APP for idiom learning. The use of information-technology-integrated cooperative learning for the learning achievement of students in the experimental group did not outperform students in the control group, but the learning satisfaction was better than those in the control group. Kurilovas and Kubilinskiene (2020) mentioned that students in the experimental group with cooperative learning outperformed students with general cooperative learning on learning achievement and learning attitude and presented positive learning satisfaction. Haidar and Fang (2019) explained cooperative learning as teachers effectively applying information technology to smooth cooperative learning; for instance, dynamic information materials and real-time team performance could assist in students' learning motivation, learning ambition, learning satisfaction, and learning effectiveness and create a quality learning environment with peer teamwork and teacher-student interaction. The following hypothesis is therefore established in this study.

H3: online cooperative learning reveals notably positive correlations with learning satisfaction.
H3-1: Online cooperative learning shows remarkably positive correlations with learning satisfaction.
H3-2: Online cooperative learning reveals notably negative correlations with learning satisfaction.

METHODOLOGY

Operational Definition

Online Cooperative Learning

Online cooperative learning, as the independent variable in this study, is measured with positive interdependence, promotive interaction, social skills, and group processing, according to the blended learning model proposed by Liao et al. (2019).

1. Positive interdependence: mutual dependence, mutual responsibility, mutual help, acceptance of assistance, and cheering up team members.
2. Promotive interaction: mutual assistance, sharing information, and providing clear explanation in the team.
3. Social skills: leadership and communication.
4. Group processing: evaluating the cooperation effectiveness of each other.

Problem-Solving Ability

Problem-solving ability, as the dependent variable in this study, is measured with exploration and comprehension, planning and execution, and monitoring and reflection, according to the problem-solving ability model proposed by Lin et al. (2018).

Learning Satisfaction

Learning satisfaction, as the dependent variable in this study, is measured with student aspects, teacher aspects, and school aspect, according to the blended learning model proposed by Travis and Bunde (2020).

1. Student aspects: including students' interests, learning motivation, learning attitude, personality traits, gender, needs, experience, learning ability, learning effectiveness, and peer interpersonal relationship.
2. Teacher aspects: covering teachers' professional ability, traits, teaching methods, curriculum arrangement, teaching content, difficulty in material design, attitude towards students, and teacher-student interaction model.
3. School aspects: containing school equipment, learning environment, environmental safety and health, teaching resources, and transportation.

Research Object and Analysis Method

College students in Fujian Province, as the research sample, were distributed 360 copies of a questionnaire for this study. After deducting invalid and incomplete ones, 298 copies were valid, with a retrieval rate 83%. After confirming the applicable online cooperative learning strategy, the actual teaching activity is practiced as planned. Four teachers practicing cooperative learning in the school were invited as the collaborative teachers to deliver the 10-week (total 50 sessions) teaching activity to 500 students in 10 classes of a university in Fujian Province. The questionnaire data collection is preceded after the end of the course.

Two-stage analysis in Structural Equation Modeling (SEM) is applied to analyze goodness-of-fit and test the model in this study. Confirmatory Factor Analysis (CFA) is first used, aiming to test the existence of independent variables in the model in order to delete dependent variables with bad effects on causal analysis. Path analysis is then preceded after the modification. Path analysis aims to estimate the relationship of model paths among variables. Without Confirmatory Factor Analysis to test independent variables, the use of path analysis might be affected by independent variables to result in bad goodness-of-fit or insignificant model paths. Goodness-of-fit test in Amos18.0 is utilized in this study. CMIN/DF of the measurement result being smaller than 5 is acceptable and being smaller than 3 is excellent; GFI, AGFI, NFI, IFI, TLI, and CFI are better higher than 0.9; and RMR, RMSEA, and SRMR are better when smaller and ideally smaller than 0.05.

RESULTS

Factor Analysis

The online cooperative learning scale in this study, with factor analysis, extracted four factors of "positive interdependence" (eigenvalue = 2.633, $\alpha = 0.84$), "promotive interaction" (eigenvalue = 1.875, $\alpha = 0.86$), "social skills" (eigenvalue = 2.236, $\alpha = 0.81$), and "group processing" (eigenvalue = 1.633, $\alpha = 0.87$). The cumulative covariance explained achieves 75.923%. The problem-solving ability scale, after factor analysis, extracted three factors of "exploration and comprehension" (eigenvalue = 3.251, $\alpha = 0.86$), "planning and execution" (eigenvalue = 2.407, $\alpha = 0.88$), and "monitoring and reflection" (eigenvalue = 2.716, $\alpha = 0.83$). The cumulative covariance explained reaches 77.493%. The learning satisfaction scale, with factor analysis, extracted three factors of "student aspects" (eigenvalue = 1.577, $\alpha = 0.80$), "teacher aspects" (eigenvalue = 2.281, $\alpha = 0.85$), and "school aspects" (eigenvalue = 2.388, $\alpha = 0.90$). The cumulative covariance explained achieves 80.762%.

Empirical Analysis Model of Structural Equation

Regarding the Confirmatory Factor Analysis (CFA) results, the convergent validity of the observation model could observe the reliability of individual observed variable, construct reliability (CR), and average variance extracted (AVE); the reliability of individual observed variable is better higher than 0.5. The factor loadings of observed items in this study are higher than the suggested value. The construct reliability is better higher than 0.6, while other researchers suggest higher than 0.5 being acceptable. The model calibration results reveal the construct reliability higher than 0.5. Average variance extracted is suggested higher than 0.5; the average variance extracted of the dimensions in this study is higher than 0.5, conforming to the suggested value.

In terms of the structural formula calibration results, χ^2/df, RMSEA, GFI, AGFI, RMR, and NFI are suggested to be $\leqq 5$, $\leqq 0.08$, $\geqq 0.9$, $\geqq 0.9$, $\leqq 0.05$, and $\geqq 0.9$, respectively. This study shows $\chi^2/df = 3.142 \leqq 5$, RMSEA = $0.032 \leqq 0.08$, GFI = $0.967 \geqq 0.9$, AGFI = $0.934 \geqq 0.9$, RMR = $0.031 \leqq 0.05$, and NFI = $0.918 \geqq 0.9$, revealing good overall model fit. Under good overall model fit, the structural formula parameter calibration results are shown in **Table 1** and **Figure 1**. The research results present online cooperative learning → problem-solving ability 0.327*** that H1 is supported, problem-solving ability → learning satisfaction 0.423*** that H2 is supported, and online cooperative learning → learning satisfaction 0.386*** that H3 is supported.

DISCUSSION

The research results prove that, in the practice of online cooperative learning, information technology makes up for the insufficiency of cooperative learning, enriches courses, promotes students' learning motivation, and drives learning effectiveness to form a positive cycle. Students' learning motivation comes from the advancement of performance and the learning confidence comes from the ideal performance. Teachers use online cooperative learning to facilitate group discussion skills and the understanding of students. They also use Google Forms to conduct digitalized tests, and mind maps and tables to improve students' problem-solving skills (Simamora, 2017). In the teaching-learning process, instructional objectives are inspected to return the teaching profession. Teachers are good at asking questions to enhance students' cooperation and encourage thinking. Especially in comprehension and analysis, the top-down relationship should be broken and the subjective consideration of teachers' cognition, ideas, and interpretation as being better than students should be avoided so that it would not come out with teachers' expected answers (Phillips et al., 2014). Students' answers could be typed with computers to respect the answers, enhance the confidence without losing students' creativity, and present brainstorming; teachers ensure the focus and integration at the end. The application of online cooperative learning could reconstruct teachers' teaching profession, and the experience and constant rolling correction could improve teaching skills to face changeable students and present the value of online cooperative learning. The intervention of information technology could change the resistance to the online cooperative learning process into assistance, helping it to become a powerful backup force of online cooperative learning, induce learning motivation, and promote problem-solving ability and learning satisfaction as the final instructional objectives.

TABLE 1 | Structural equation modeling result.

Parameter/evaluation standard	Coefficient
Online cooperative learning → problem-solving ability	0.327***
Problem-solving ability → learning satisfaction	0.423***
Online cooperative learning → learning satisfaction	0.386***
χ^2/Degree of Freedom $\leqq 5$	3.142
Root Mean Square Error of Approximation (RMSEA) $\leqq 0.08$	0.032
Goodness-of-Fit Index (GFI) $\geqq 0.9$	0.967
Adjusted Goodness-of-Fit Index (AGFI) $\geqq 0.9$	0.934
Root Mean Square Residual (RMR) $\leqq 0.05$	0.031
Normed Fit Index (NFI) $\geqq 0.9$	0.918

***$p < 0.001$.

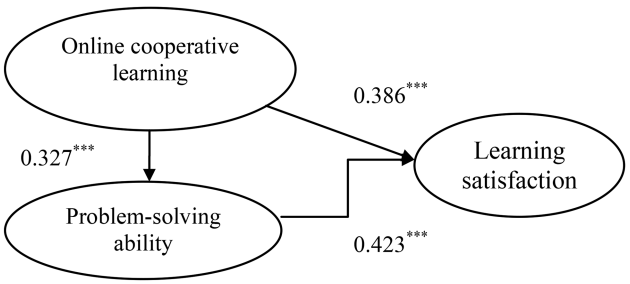

FIGURE 1 | Model path diagram. *** $p<0.001$.

Alves et al. (2019) explained collaborative problem solving as an individual or more than two companions with sufficient capability sharing knowledge and skills through communication and dialogue, collaboratively and effectively participating in activities, and developing teamwork to solve encountered problems. Collaborative problem solving referred to a task being collaboratively completed by several partners. Each partner had to positively participate, mutually coordinate, and help each other in the same situation to solve problems with teamwork so as to effectively enhance learning satisfaction. The intervention of information technology could make the best out of a bad situation in the online cooperative learning process to support online cooperative learning, induce learning motivation, and promote problem solving capability and learning satisfaction as the ultimate instructional objectives. The research result conforms to the points of view proposed by Munawar and Chaudhary (2019) and Haidar and Fang (2019).

Teachers need full training to guide students with "stretching and jumping" opportunities in the "interactive relationship." Meanwhile, teachers need full wisdom to help students move from conflict compromise to positive trust (Ramdani et al., 2019). What is more, multiple evaluations outside the classroom, such as completion of team assignments, quiz performances, and sectional examination performance, help teams not to slack. Besides, each member is important that no-one is confident of the winning (Hafeez, 2021). Students would search network data, discuss grounded arguments, focus on discussion through information technology, and save a lot of time for groupwork. Teachers, with statistics, would announce team performance with data at any time to induce competition and crisis awareness of teams. There might be conflict in a team, but a contest with multiple evaluations allows individuals to give up personal prejudice and unite to make effort for the team. It naturally reinforces the group process of cooperative learning (Akdemir et al., 2020).

CONCLUSION

The research results show that the item of "*Teachers currently use the instructional method of online cooperative learning to make courses interesting and active*" receives the highest score in online cooperative learning strategies, revealing the acquisition of student identity. The item of "*I think the use of platform[s] for Internet communication media could help the communication and teamwork between team members and I in the cooperative learning course*" receives the highest score in problem solving capability, revealing the acquisition of student identity. The item of "*I think the application of online cooperative learning could enhance learning ability and confidence*" receives the highest score in learning satisfaction, revealing the acquisition of student identity.

The research results prove that students' responses in class are a mirror reminding teachers of the need to adjust the instructional methods. In traditional didactic instruction, students' academic achievement decides teachers' success. In the use of online cooperative learning, students' learning motivation awakes teachers' passion. Teachers could continuously retain the original instructional methods; nevertheless, modern students are active and there are special students who are extroverts or introverts. These students may challenge teachers' authority. Teachers can easily get tired if they do not adapt their instructional methods according to the diverse needs of students. The assistance of information technology in the practice allows seeking consensus from online resources in the team discussion. Under the situation with a well-grounded argument, students are convinced by each other to contribute to the successive discussions. The research result conforms to the points of view proposed by Weaver et al. (2019) and Ingrid (2019). With online cooperative learning, teachers simply combine the original computer software with cooperative learning courses through the Internet, rather than re-learning brand new and strange computer software. Teachers who enjoy learning and self-growth could challenge themselves and activate teaching with advanced functions. However, it should be kept in mind that information technologies are only tools; using media can attract students' attention in a short period, but having students internalize knowledge is the goal. Karakus Taysi (2019) mentioned the aims of education as helping individuals live their life. The development of individual critical thinking and problem-solving skills are the main aims of contemporary education. Teachers did not simply propagate the doctrine, impart professional knowledge, and resolve doubts in the teaching process, but had to help students link old experience with new knowledge, make tight cognitive structures for meaningful learning, and further solve problems to effectively promote learning satisfaction.

Online cooperation learning method is important for cultivating students' independent thinking, interpersonal communication, competition awareness, and teamwork (Cortez et al., 2021). Teachers and students are good at utilizing information technology to have students focus on discussion content and direction, instantaneously acquire the answers and feedback and correction, and improve team performance with data (Mutua and Ong'ong'a, 2020). When making effort in the learning process, the learning result would not be lower than the expected performance and students would reflect this with their learning satisfaction.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

This study was reviewed and approved by the ethics committee of the Huaqiao University. Written informed consent was obtained from all participants for their participation in this study.

AUTHOR CONTRIBUTIONS

Y-PW performed the initial analyses and wrote the manuscript. T-JW assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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BRIEF RESEARCH REPORT
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Discussing the Effect of Students' Crisis Awareness on Emotion During the COVID-19 Pandemic From the Perspective of Trust

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The effects of crises vary among individuals, societies, and nations. Governments' crisis management is quite different from that of non-governmental organizations, especially in terms of "publicity," since it involves bureaucracy to address people's accountability concerns. The purpose of this study is to investigate the relationship between students' crisis awareness, trust, and emotions in the event of a major public health emergency. A questionnaire survey was conducted for this study. A total of 500 copies of questionnaires were distributed to the college students in Jiangxi. Among those, 437 valid copies were retrieved, with a retrieval rate of 87%. A structural equation model (SEM) was used to conduct the statistical analyses. The research results were summarized as follows: (1) At the stage of epidemic spread, people can easily fall into the negative emotion. (2) The society with a good trust relationship considers schools less responsible for critical incidents and more helpful for crisis communication. (3) Reducing the negative emotions of the public after the occurrence of critical incidents can effectively reduce the damage of critical incidents to the organization. Avoiding a loss of student confidence and increasing anger, protecting the school's reputation, having a good communication effect, and minimizing the impact of the crisis can help the students develop better trust toward the school. When a crisis occurs on campus, this can reduce the possibility of students' showing negative emotions and spreading rumors. It is considered that the findings provide guidance on how to optimize the management of public health crisis situations and improve students' mental health.

Keywords: coronavirus disease 2019, crisis awareness, trust, emotion, time pressure

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INTRODUCTION

It is inevitable that public institutions, private business enterprises, or non-governmental organizations will face various forms of crisis situations. None of these organizations is able to escape a crisis. Even organizations with a good reputation are exposed to the risk of crises. This is the time of crisis in society when individuals in all organizations with external interaction can experience the severe conditions of crisis. The effects of crises are different for individuals, society, and the nation. When crisis events affect the safety of people and property, they attract attention, and the injuries and losses suffered can more easily attract attention. A media report

about an accident or disaster can easily draw public attention to the issue. Similar to diseases, the development of the Internet in recent years has accelerated the flow of information in society. The media can quickly update the news network to instantly spread crisis events throughout the world (Huang and Chen, 2020).

The great epidemic of novel coronavirus pneumonia in 2020 was a test for the world. By March 29, 2021, there were more than 127 million confirmed cases worldwide. The World Health Organization (WHO) announced that it had classified the epidemic as a public health incident. Crises are incidents with high uncertainty and threatening aspects. As in the example of diseases, crises show the stages of incubation, outbreak, sequelae, and resolution. The development of true crises can be irregular and repetitive, similar to diseases. The outbreak does not occur for no reason; it could be an infected virus that has been in incubation for a period of time (Chan et al., 2020). With proper treatment during this period, it would recover without an outbreak. Effective crisis management is important for crises. Crisis management can be divided into different aspects and phases, such as the phases before, during, and after the incident, or precaution, preparedness, response, and recovery. The phases of learning and evaluation can also be included at the end. Different experts work on different topics and objects and study crisis management from different aspects. Such management also includes many processes such as planning, organization, budget, and control. However, there exist great differences in crisis management between governmental and non-governmental organizations, especially in terms of "publicity" since it involves bureaucracy to address people's concerns about accountability.

Since the outbreak of COVID-19, schools are moving to online courses in various areas. Huang and Chen (2020) conducted a study with the participation of professors in Hong Kong to study the effects of novel coronaviruses on students and office workers worldwide. They discovered that 48% of the respondents noted an increase in study stress and 54% of them reported a decrease in learning efficiency due to web-based learning. Compared to students, office workers generally accepted and satisfied with the home-based work arrangement. The survey on HK employees' opinions and experiences of working from home revealed that more than 70% of the interviewees considered that they had more resting time in home-based work, 64% reported a decrease in working pressure, and about 50% (49.2%) revealed that home-based work led to better family relationships. Clearly, coronavirus disease had stronger emotional effects on students than on office workers. Li et al. (2020) analyzed the factors for students' academic success and found out that 31% of the factors were due to positive emotions, including hope, wellbeing, and engagement. The survey revealed the highest percentage for hope (13%), followed by engagement (10%) and wellbeing (8%). Olivia Schultes et al. (2021) pointed out the importance of having positive emotions to successfully navigate a new environment, build meaningful relationships, and reach a person's maximum potential. Huang and Chen (2020) mentioned that teachers' emotional awareness and unconditional positive concerns can predict students' adaptation to schools, trust, and emotions.

Chan et al. (2020) mentioned that the British Academy collected 583 copies of questionnaires from international/local college students in 26 countries and regions in Africa, Asia, Australia, Europe, North America, and South America. It was found out that up to 90% of the interviewees revealed "medium to great" effects of the epidemic on the learning activity. During the survey, 61% of the interviewees were in the countries and regions where they studied, and 14% of them did not know where to seek for medical assistance when symptoms appeared. Moreover, about half of the interviewees (47.5%) thought about the risk of confirmed coronavirus disease, and about 71% of them showed anxiety. This awareness of crisis and epidemic prevention measures, such as reducing social contact, resulted in loneliness in 45% of the interviewees.

Mouter et al. (2021) stated that in times when society faces great environmental pressure, people may panic due to inadequate information and worry about other people's views, the possible effects on their lives, and ignorance of the epidemic, leading to a fear of confirmation. In addition, it was normal to be nervous, anxious, and uncertain about symptoms and consequences when they have a confirmed diagnosis. Klapperich et al. (2020) mentioned that the outbreak of the COVID-19 epidemic resulted in more people having to stay at home and self-monitor their health. In addition to readjusting to their lives and work, they suffered from tremendous physical and psychological stress during the epidemic. Clinically, many people needed psychotherapy because they were too preoccupied with the intense media coverage of the growing epidemic. Lin et al. (2020) indicated that many students were taking online courses and living with their parents because of the epidemic. The friction with parents during the epidemic resulted in great perceived pressure; those with suppressed personalities could be easily depressed, did not know how to release their emotions, could not focus on online courses, and were easily irritable. The pressure exceeded the critical point of self-adjustment and could not be managed, so the cases of psychiatric/psychological health diagnoses caused by coronavirus disease increased greatly.

With the rapid change in the social environment, crises such as natural disasters, accidents, human factors, and suicide keep occurring on the campus, which was originally a safe and happy place of learning. Each event is in the media spotlight (Rezaei et al., 2014). In 2005, in order to maintain campus safety, Lee (2016) divided campus events into "campus accident," "maintaining campus safety," "campus violence and deviant behavior," "discipline controversy," "protection of children and youth," "natural disaster," "other campus affairs," and "illness." According to the statistics, illnesses occurred most frequently, followed by accidents on campus. Illnesses cannot be controlled by school administrators, but accidents are not completely unavoidable; most accidents could be prevented. Schools should take responsibility for the resurgence of the local COVID-19 epidemic in China and the spread on campus. The epidemic in China is currently showing several outbreaks. Considering the prevention and control of the current epidemic situation, many schools have decided to strengthen the daily management

of students (Chan et al., 2020). All students stay in school, and the process of learning continues in school. Olivia Schultes et al. (2021) found that more frequent testing would increase the case rate but could better prevent the spread of infection. They also mentioned that campuses are not closed groups, so even if there is a vaccine, schools should continue testing students for COVID-19 and implement strategies to slow the spread of infection. Clearly, crisis awareness among both schools and students is extremely important.

Most previous studies on the crisis have addressed crisis management issues. In this study, it was found that data analysis was rarely used in previous studies. On the contrary, qualitative research or content analysis was mostly used (Samantha, 2018; Eggers, 2020; Fabeil et al., 2020). Moreover, the core of the crisis focused on the relevance of the "situation-strategy-effect," and the communication effect was mostly tested with a single situation and a single strategy, while the effects on the affective states of research participants' were rarely discussed (Huang and Chen, 2020; Vally, 2020; Mouter et al., 2021). Regardless of whether the participants were from the public sector, private companies, or non-profit organizations, the crisis of campus students was rarely considered as a research direction. This study aims to discuss the relationships between student crisis awareness, trust, and emotions during major public healthcare emergencies to further optimize crisis management and improve students' mental health.

LITERATURE REVIEW AND HYPOTHESES

Research on Crisis Awareness and Trust

Vally (2020) defined a crisis as an unforeseen crisis in an organization for which there are no programs or plans. Cheng and Hahm (2019) defined a crisis as a disruption to the overall operation of the system and a threat to the basic setting, self-subjective perception, and current core objectives. Janssens et al. (2019) considered that crisis is used in conjunction with the meanings of threat or dilemma; crisis refers to the individual's or group's perception of potential negative effects that result from not applying certain remedial actions. Akgunduz and Eryilmaz (2018) considered that a crisis seriously threatens the basic gains and structure of a society, system, or organization and even threatens fundamental values and norms. Bansal et al. (2020) classified the characteristics of a crisis as uncertainty, incomplete information, communication difficulties, and complicated conditions. From a management perspective, people in a crisis have to make important decisions under time pressure and in an uncertain situation.

Lin et al. (2020) considered external communication at the first moment as the key to the success of crisis management rather than the whole crisis management plan. This is because a crisis would raise the crisis awareness of the media and the public. Without developing appropriate communication strategies, this could easily affect trust in the organization, leading to an outcry and even a boycott. The impact on the organization is therefore obvious. The epidemic, according to Chan et al. (2020), highlighted the importance of transparency in rebuilding trust for solutions in times of trust crisis. They found out that trust in the government was not the only important issue but that society considered different levels of trust given the impact of the epidemic, especially trust in civil society, public health experts, and the government, and the mutual effect between these variables. Trust was essential to stop the virus in time. Flexible and sustainable long-term policies, as well as transparency and openness of information, were extremely important. Research revealed that transparent information was the best way for the government to influence public awareness of the crisis awareness and rebuild trust during the epidemic, and that information should be clear and consistent. Forster et al. (2020) believe that the relationship between crises and emotions is the reason why the public is affected by crisis events that trigger emotions that are detrimental to both the organization and public trust. The public or interested party would evaluate an organization's responsibility for crisis events through attribution. The emotions of the public are influenced by the attribution of responsibility. The higher the attribution of responsibility, the greater the public anger, which affects the trust in the organization. In this case, the damage that crisis events inflict on an organization and the extent to which they elicit negative public trust and emotions were defined by public crisis awareness. Vojtko et al. (2019) stated that mass society, after receiving crisis information from the media, does not immediately look for the cause of the incident but may reduce trust and emotions based on the outcome of the incident. The resulting emotions were derived from the incident process after receiving the media report. In this case, this study proposes the following hypothesis:

Hypothesis 1: Crisis awareness has a negative and significant impact on trust.

Research on Trust and Emotions

Research on trust has been discussed in various fields, such as psychology, sociology, economics, and marketing. Fritz and Gallagher (2020) defined "trust" as a party willing and expecting the other party to perform a specific behavior without monitoring or controlling the other party in the process. According to the literature, trust is a necessary factor for two groups to join together because the existence of trust can reduce the risk of cooperating parties and guarantee future gains (Natarajan and Gombolay, 2020). In other words, if trust between two groups led them to believe that the opposite parties would fulfill the obligation, the risks caused by speculation could be reduced (Loffler et al., 2020). Thus, the trust between companies and customers is similar to the trust between people, which helps understand each other and has positive effects on the mutual relationship. In this case, a company would be welcomed by partners with capabilities, goodwill, and honesty to enhance the trust. Wang et al. (2020) considered that the trust relationship between consumers and companies should be taken into account when considering a crisis situation. The trust relationship between a company and an interested party offered the significant explanatory potential for the crisis situation. Benvenuto et al. (2020) indicated that consumers in crisis situations would try to analyze and perceive crisis situations from the perspective of companies. In other words, mass consumers analyze and judge

crisis situations differently depending on the quality of their trust relationship with the brand. The quality of the trust relationship between consumers and a brand would influence and shape consumers' judgment and perceptions of crisis situations and affect their opinions about the enterprise during the crisis. A poor trust relationship or crisis background would make it easier for the public to attribute responsibility for the crisis to the companies and show their emotions. Pavlatos and Kostakis (2018) mentioned that the public would attribute less responsibility to companies with a good trust relationship during a crisis incident in order to generate less negative emotions toward the companies. Mouter et al. (2021) stated that people's trust in the government affects their attitude toward epidemics. In other words, trust in government influences emotions to affect epidemic prevention behaviors; people who believe in the latest and correct epidemic information provided by government agencies show positive emotional perceptions to enhance the effect of epidemic prevention. Therefore, this study proposes the following hypothesis:

Hypothesis 2: Trust has positive and significant effects on emotions.

Research on Crisis Awareness and Emotion

Emotions, complicated psychological processes, are triggered by certain events in the external environment (Wang et al., 2019). Klapperich et al. (2020) defined emotion as an individual psychological response to stimuli in the external environment to acquire subjective emotions and individual experiences. Roy et al. (2019) considered that emotion is psychologically complicated and influences physiological response, which includes individual subjective mental state, individual impulse to take action, and individual major physical changes. Michelle et al. (2019) proposed emotion as a natural emotional response to the interpretation of events. In psychology, emotion refers to the individual physiological response affected by stimuli in the external environment or internal physical conditions to cause an individual psychological imbalance. The imbalanced state was chaotic, agitated, excited, and nervous state.

Huang et al. (2020) explained emotions as psychological reactions triggered by the external environment or specific events that elicit different emotional responses and lead to different behavioral intentions. The research on crisis communication rarely focused on the effects of emotional reactions of the interested party and the society to crisis events in organizations. However, dealing with the emotions of the interested party and society as a whole is an important part of crisis events. When society shows dissatisfaction toward an organization, the organization's crisis response strategies are reduced. Erokhin et al. (2019) pointed out the mediating role of public anger between crisis responsibility and negative image and suggested that an organization should consider reducing public anger as the primary goal when managing crisis events to reduce the impact of negative rumors caused by the public anger on the organizational image. Schupper et al. (2020) found out that of the many emotions felt by the public during an incident, only anger and vigilance have significant effects on the organizational image. In this case, after the occurrence of crisis events, an organization must first assess the emotion type of the interested party to respond to the various emotions of the public. Reducing the emotional response of the public can effectively reduce the damage of crisis events to the organization. Fabeil et al. (2020) pointed out the difficulty of effectively building a favorable communication bridge with the public during the epidemic. People would panic and become aware of the crisis because they do not understand the government's epidemic prevention measures to show further present negative emotions without effective cooperation to reduce the epidemic prevention effect. Accordingly, this study proposes the following hypothesis:

Hypothesis 3: Crisis awareness has a negative impact on emotions.

METHODOLOGY

Conceptual Structure

Based on the literature review above, the conceptual structure for this study was designed (**Figure 1**) to investigate the relationships between crisis awareness, trust, and emotions.

Operational Definition

Crisis Awareness

Crisis awareness as an independent variable in this study contains three dimensions, according to the blended learning model proposed by Zhang et al. (2020).

1. Loss perception: The difference between the actual and ideal conditions could be the determinant of possible loss of value. But the importance of the problem could influence the perception of lost value. That is, the same crisis could lead to different losses in different organizations, even if the problem is the same.
2. Loss probability: Even though the potential loss of value is high, the low probability of occurrence may reduce the perception of crises.
3. Time pressure: The more distant the time of the possible negative outcome, the less the crisis can be perceived. Among the factors involved in the perception of time as a source of pressure is that 1. It becomes serious if the problem is not solved. In other words, if the problems are not solved, the negative effects may be perceived more strongly, and 2. The time to find appropriate solutions is limited.

Trust

In terms of trust, as the dependent variable in this study, following the trust model proposed by Huang et al. (2021), three dimensions are organized for building trust in this study.

1. Ability: This refers to individuals or enterprises that are preferred by trustees because they have rich knowledge in specialized or professional fields that meet the needs of trustees (clients). At the same time, the trustees also believe that the trusted individuals or enterprises are capable of efficiently fulfilling their promises.

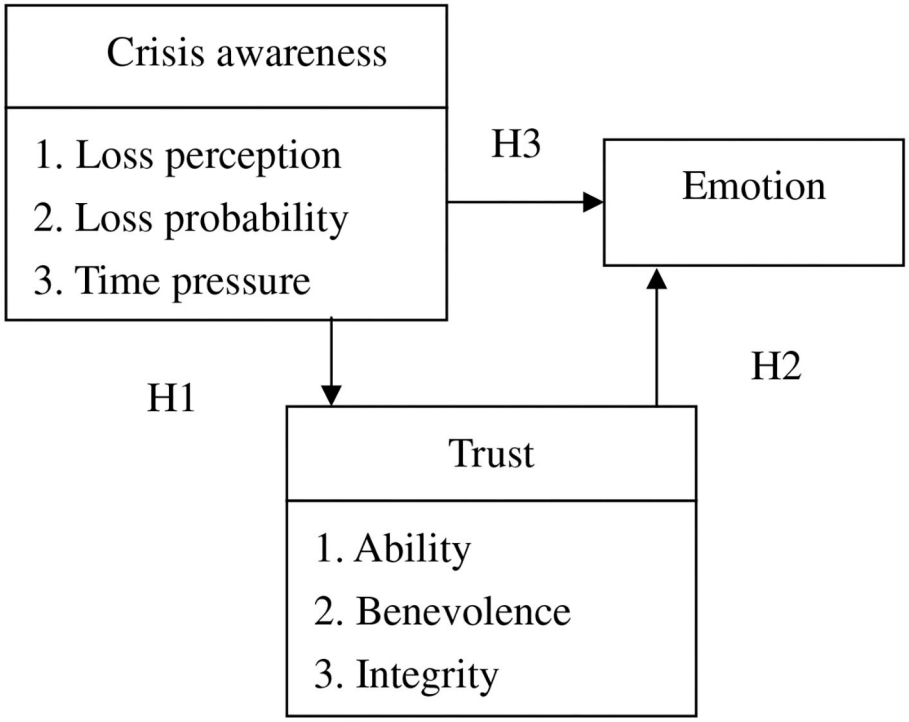

FIGURE 1 | Conceptual structure.

2. Benevolence: This refers to individuals or companies that have special feelings for the trustees and care about them from the heart. Individuals or enterprises with benevolence assume the sustainability of clients' equity and even sacrifice equity to maintain clients' profits.
3. Integrity: This refers to individuals or enterprises that abide by the agreement with the trustees under their care, without destroying or disregarding certain promised principles.

Emotion

The emotion scale, as the dependent variable in this study, was used to measure individuals' emotions during the pandemic, according to the emotion model proposed by Li et al. (2020).

Participants and Objectives

The participants of the study were composed of college students in Jiangxi Province. Convenience sampling was adopted in this study. The school addresses and contact persons were first confirmed to explain the research objective and request. After receiving the consent to cooperate, the folders, containing the questionnaire, the printout of precautions, the envelope, and a nice gift, were sent to the schools personally.

To ensure that the samples match the population proportion, case officers were verbally informed of the arrangements made by the researcher for distributing the questionnaires. These included samples that cover all genders, grades, and departments were distributed on average and do not focus on a single grade or division. The written arrangements and the questionnaire were then sent to the schools in the sample. A total of 500 copies of the questionnaire were distributed. Among those, 437 valid copies were retrieved with a retrieval rate of 87%. The sample structure of this study contains 223 males and 214 females. Among the participants, the participants' distribution by their level of education was determined as 108 first-year students, 106 second-year students, 112 third-year students, and 111 fourth-year students. The participants were composed of 74 students from North China, 122 students from East China, 83 students from Central China, 60 students from South China, 67 students from Southwest China, and 31 students from Northwest China. The family economic status of students was found as 72 wealthy, 289 well-off, 47 poor, and 29 low-income families.

Reliability and Validity Test

Confirmatory factor analysis (CFA) is an important part of SEM. The measurement model should be tested before modifying the structural model evaluation with the two-level model. When the goodness-of-fit of the measurement model is acceptable, SEM is conducted as the second step. The dimensions analyzed in this study with CFA have the factor loadings between 0.60 and 0.90, the composite reliability between 0.80 and 0.90, and the average variance extracted between 0.70 and 0.85. These results meet the standards of 1. factor loadings >0.5, 2. composite reliability >0.6, and 3. average variance extracted >0.5. Thus, the dimensions exhibit present convergent validity.

TABLE 1 | Goodness-of-fit analysis of the research model.

(Fit Indices)	Allowable range	This research model	Model fit judgment
χ^2 (Chi-square)	The lower the better	19.63	
χ^2-degree of freedom ratio	<3	1.83	Match
GFI	>0.9	0.95	Match
AGFI	>0.8	0.89	Match
RMSEA	<0.08	0.04	Match
CFI	>0.9	0.94	Match
NFI	>0.9	0.92	Match

TABLE 2 | Overall results of linear structural model analysis.

Evaluation item	Parameter/evaluation standard		Result
Preliminary fit	Crisis awareness	Loss perception	0.72**
		Loss probability	0.66*
		Time pressure	0.63*
	trust	Ability	0.75**
		Benevolence	0.69*
		Integrity	0.73**
Internal fit	Crisis awareness → trust		−0.83***
	Trust → emotion		0.82***
	Crisis awareness → emotion		−0.87***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Correlation Analysis

Pearson correlation analysis is used to examine the linear correlations between two continuous variables (X, Y). A large absolute correlation coefficient between these two variables indicates a large covariance. When two variables have a positive correlation, Y generally increases as X increases. In contrast, Y decreases with increasing X, if there is a negative correlation between the two.

Structural Equation Modeling

Structural equation modeling (SEM) is a method for dealing with the measurement error. It uses multiple indicators to reflect the latent variables and makes the estimation between model factors more accurate and reasonable than the traditional regression method. Structural equation modeling and covariance structure modeling (LISREL) are popular and important data analysis skills. In the research for higher degrees in universities, it is an important topic for multivariate analysis; comparatively important social, educational, and psychological journals have special sections for it. Obviously, the fame and high status of SEM in statistics are undoubted.

RESULTS

Structural Model Analysis

The structural model analysis includes the goodness-of-fit analysis of the research model and the explanatory power of the whole research model. Thus, referring to experts' opinions, seven numerical indices were used to test the overall model fit, including the chi-square (χ^2) test, the χ^2-degree of freedom ratio, the goodness-of-fit index, the adjusted goodness-of-fit index, the root-mean-square error, the comparative fit index, the comparative hypothesis model, and the chi-square test of independence. The overall results of the analyses were summarized in **Table 1**.

In summary, when testing the model fit with the χ^2-degree of freedom ratio, the ratio should be lower. The χ^2-degree of freedom ratio in this study was found to be <3 (1.83). GFI and AGFI are expected to be close to 1, and there are no absolute standards to judge the model fit. Moreover, the results for GFI and AGFI were found to be acceptable with GFI > 0.9 and AGFI > 0.8. GFI and AGFI in this study were 0.95 and 0.89, respectively. RMSEA in 0.05–0.08 indicates a good model with a reasonable fit. RMSEA in this study was found as 0.04. The allowable standard of CFI is > 0.9; and the CFI of the research model in this study was found as 0.94. The NFI should be at least higher than 0.9; and the NFI of this research model was found as 0.92. Overall, the goodness-of-fit indices meet the standards and indicate that the research results of the model are acceptable. Therefore, the research sample data can be used to explain the actual observed data.

The previous overall model fit indices have shown that there existed an acceptable goodness-of-fit between the model structured in this study and the observed data. These results indicate that the theoretical model can fully explain the observed data. In this case, the correlation coefficients and coefficient estimates of crisis awareness, trust, and emotion could be better understood after the model fit test.

The research data are given in **Table 2**. The results of the analysis of the whole model showed that three dimensions of crisis awareness (loss perception, loss probability, and time pressure) can significantly explain crisis awareness ($t > 1.96$, $p < 0.05$). Similarly, the three dimensions of trust (ability, benevolence, and integrity) can explain trust significantly ($t > 1.96$, $p < 0.05$). Obviously, the overall research model shows a good preliminary fit.

In terms of internal fit, crisis awareness shows negative and significant correlations with trust (−0.83, $p < 0.01$), trust reveals positive and remarkable correlations with emotion (0.82, $p < 0.01$), and crisis awareness shows negative and notable correlations with emotion (−0.87, $p < 0.01$). Accordingly, it can be concluded that H1, H2, and H3 were supported.

Correlation Analysis

The variables in the research structure were analyzed using Pearson correlation analysis as the preliminary test to discuss the correlations between the variables. The results are shown in **Table 3**.

Analysis Result

The research results revealed the significance of the model. The results of the hypotheses tests are shown in **Table 4**.

TABLE 3 | Overall correlation analysis.

Variable	Loss perception	Loss probability	Time pressure	Ability	Benevolence	Integrity	Emotion
Loss perception	–						
Loss probability	0.62**	–					
Time Pressure	0.66**	0.57**	–				
Ability	−0.71**	−0.69**	−0.72**	–			
Benevolence	−0.76**	−0.75**	−0.74**	0.51**	–		
Integrity	−0.79**	−0.72**	−0.77**	0.55**	0.57**	–	
Emotion	−0.81**	−0.86**	−0.82**	0.74**	0.70**	0.73**	–

TABLE 4 | Hypotheses testing.

Research hypotheses	Correlation	Empirical result	*P*	Result
Hypothesis 1	–	−0.83***	0.00	Supported
Hypothesis 2	+	0.82***	0.00	Supported
Hypothesis 3	–	−0.87***	0.00	Supported

DISCUSSION

High negative emotions of students with high crisis awareness show a similar conclusion as the previous studies. Karkoulian et al. (2016) found that people with an internal locus of control attribution style may perceive greater pressure when faced with limited resources and time pressure. When faced with severe and unpredictable threatening events, individual efforts might not affect the result. Therefore, it might be better for individuals to control their attitudes. It is discovered in this study that students when faced with a serious threat of a pandemic, they were more concerned with the contemporary emergency factors mentioned above, while the psychological factor of trust, which requires rational thinking and comprehensive judgment, did not seem to be as important. With low crisis awareness, the rational person hypothesis develops the function when students' safety is not seriously affected by the pandemic. Similarly, people could make rational thinking and comprehensive analysis to show less-negative emotions. In this study, trust with new perspectives in a major public health incident has certain theoretical and practical meanings. First, the general public did not show high negative emotions triggered by the COVID-19 pandemic. However, they showed higher trust in the government in terms of effectively controlling the pandemic. This shows that the party and the government have the status in people's minds that the governing capacity is tested and recognized. Second, emotions are influenced by the environment. During the pandemic, people's negative emotions should be released and integrated through various channels. Finally, increasing the trust or decreasing people's perceived threat can positively influence people's physical and mental health when they face similar incidents in the future. Schools should take responsibility for campus accidents. Nevertheless, schools with limited budgets would not necessarily adopt a compensation strategy, instead, an apology, expression of concern, or correction of action can achieve a similar communication effect (Andreassen et al., 2016). It is suggested that schools should portray sincerity in problem-solving when using communication strategies to reinforce the communication effect and protect their reputation. When critical incidents occur on campus, the school should explain the cause as soon as possible and adopt a responsible attitude to reduce the students' awareness of the school's responsibility for crises, thus reducing students' anger and avoiding rumors. It can also facilitate the acceptance of explanations, protect the organization's reputation, and have a good communication effect. A school with a better reputation can reduce the possibility of negative word of mouth by students in the event of a crisis on campus. This proves that a good trust relationship can benefit the effect of crisis communication. In addition, school crisis managers should respond immediately to the outside world and not hide from the media when critical incidents occur on campus. Otherwise, there could be negative media exposure when the media asks for a third party's opinions, and the damage to the school from critical incidents will be even greater. The school's crisis managers should respond well to the problem and keep the emotions of stakeholders high during campus critical incidents. A gloat mainly comes from the public, which is composed of non-stakeholders. Crisis managers should respond to every part of a critical incident and avoid a gloat of public opinion in order not to damage the school's reputation. Trust depends on the public evaluation of the school's past performance. Once campus accidents occur, the school's communication would be more easily accepted to avoid emotional and negative word-of-mouth (Dowling and Doyle, 2017). For this reason, schools are recommended to abandon their closed-minded attitude, connect with people in the community, and even actively contact the media to establish a good with the public to improve their reputation.

CONCLUSION

The study results revealed that certain rumors can exist in rural areas with limited information during the pandemic, especially at the beginning of the pandemic. People can easily feel negative emotions when there are no official information and people are caught off guard by the crisis. The higher the risks in crisis events, the stronger the negative emotions are experienced, as well as the more negative emotions can be observed to loop with rumors. Most students receive crisis information through video footage

in the media. Therefore, school crisis managers need to reassure students who watch videos in the media and have high crisis awareness after the outbreak of COVID-19 to restore trust in schools and reduce students' intention to spread negative word of mouth. Moreover, finding crisis management methods and crisis communication content that reduce students' negative emotions can effectively mitigate the impact of crisis responsibility from the public's perspective. Furthermore, rural areas are places where people live in groups. Therefore, this lifestyle can easily lead to a cluster effect. Individual negative emotions caused by information overload can easily spread in these environments. This finding is similar to the results of the studies conducted during the SARS epidemic (Qian et al., 2003) and H7N9 avian influenza (Zhang et al., 2015). In a situation with a greater threat factor, people can perceive external risks more easily, and higher crisis awareness can easily result in negative emotions. Zhou et al. (2020) pointed out in their study that people who were more exposed during the SARS epidemic, such as healthcare workers in isolation wards, experienced significantly more psychological pain than other healthcare workers. In addition to the risk of exposure, fear of infection was the most important factor in the stress response. People with a high perception of crisis rated the likelihood of infection higher and were more concerned about their personal safety. It is therefore understandable that their negative emotions were higher than those of individuals with a low threat perception. Berg and Aber (2015) mentioned that in cases of campus accidents, the public's acceptance of the organization's perception of crisis responsibility, anger, and acceptance of the organization's explanation would be influenced by the reputation of the organization to generate negative word-of-mouth (Cavaiola and Colford, 2017). In other words, a school with better trust would reduce negative emotions and negative word-of-mouth from the public when there is a crisis on campus. This proves that the good reputation of the school would benefit the effect of crisis communication (Kar, 2014).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

CY performed the initial analyses and wrote the manuscript. YM assisted in the data collection and data analysis. Both authors revised and approved the submitted version of the manuscript.

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Correlation Between Learning Motivation and Satisfaction in Synchronous On-the-Job Online Training in the Public Sector

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Non-governmental organizations often regard expanding revenue and reducing costs as standard procedures to achieve corporate sustainability, while at the same time considering human resources as important assets. Government agencies have greater flexibility in staffing, and their human resource strategies for employee education and training often use organizational learning to develop operational performance. Training is regarded as a panacea for corporate sustainability and channels have been established to support employees' learning. Curriculum development of synchronous online learning is an approach that requires further investigation. We distributed 360 questionnaires to supervisors and employees of the Taipei City Government, Taiwan. A total of 268 valid copies were retrieved, giving a response rate of 74%. The study results are expected to help public sector employers enhance employee cohesiveness and generate more operational team spirit.

Keywords: public sector, on-the-job training, synchronous online learning, learning motivation, satisfaction

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INTRODUCTION

Non-governmental organizations often aim to achieve corporate sustainability by expanding revenue and reducing costs. Although human resources are regarded as an important company asset, at the same time, employees are asked to maximize the production capacity. Each employee has unique characteristics and business owners typically try to maximize individual performance for corporate sustainability. Government agencies—in contrast with non-governmental organizations—have greater flexibility in staffing. In the wake of globalization, information transparency, and global competitiveness, governments have prioritized the development of methods and strategies to promote competitiveness. To maintain a national competitive advantage and meet citizens' expectations, there is an urgent need to improve the skills of employees in public sector organizations.

Traditional models of education and training emphasize professional knowledge and technologies, and might involve a group of people sitting in a classroom listening to a lecturer—a passive "armchair" strategy. To broaden and deepen education, the Taiwanese government is dedicated to promoting digital learning activities for public servants through the application of information technology to digital learning. The aim is to improve the competence of the workforce and their professional skills. Many public sector agencies are aware of the importance of digital learning and are developing plans to promote digital learning and establish a public sector digital learning network with relevant courses for civil servants. Digital learning will be promoted and

used to improve the professional skills of civil servants and promote the competitiveness of the government.

Organizational learning has become more popular in recent years. Training employees to advance operational performance is sometimes considered a panacea for corporate sustainability. Following this trend, the public sector has established many learning channels for employees, including curriculum development of synchronous online learning. Advances in information technology and the Internet have facilitated changes and growth across industries. In the context of dynamic business strategies and technologies, employees must grow and adapt to cope with the changeable working environment, especially when seeking promotion. Computers have led to widespread Internet use and changes in educational trends and the way people acquire knowledge. Mobile learning is a continuous learning approach that facilitates learning through action. Such active learning is more effective than traditional approaches that involve memorizing information, and advantages include longer-term impacts for organizations.

The methods and skills of private enterprises can be applied to research on human resources and the organizational characteristics of the public sector. Even though the recruitment, assessment, training, counseling, and retirement systems of government agencies are largely different from those of non-governmental organizations, these approaches could affect and benefit employee training. On-the-job training could directly enhance professional knowledge and skills and change individuals' professional attitudes. The training may also improve service quality, and indirectly and intangibly strengthen confidence in personal ability and job satisfaction. On-the-job training in the public sector could enable these organizations to cope with the rapidly changing environment. Organizations would be better able to meet professional standards and guarantee service quality. However, on-the-job training may need to be suspended in public sector workplaces when crises or accidents occur (Chen et al., 2020).

Bad weather, transportation challenges, and pandemics such as SARS and COVID-19 may create situations where large groups and in-person activities should be avoided. In non-pandemic scenarios, this might involve an interruption in knowledge delivery. However, the delivery and acquisition of information become more important in response to an epidemic (Yang et al., 2004). To overcome such situations, synchronous online learning, not restricted by time and space, could be used for on-the-job training (Richarson and Swan, 2003). Accordingly, we focus on the correlation between learning motivation and satisfaction with synchronous online on-the-job training in the public sector. The findings may contribute to the enhancement of employee cohesiveness to increase operational team spirit in public sector workplaces.

LITERATURE REVIEW AND HYPOTHESIS

Sung and Hwang (2018) discuss the broad application of e-learning to on-the-job training in Europe and the US. In-service staff cannot always participate in regular classes because of their work commitments and multiple roles. The accessibility of e-learning removes the learning limitations for in-service staff without them having to leave home. Stouthuysen et al. (2018) used traditional teaching and e-learning to teach nursing to college students, and found no difference in learning outcomes. Students considered convenience, flexibility, and saving money as the main factors for choosing distance learning courses to enhance their learning motivation. In-service staff considered the flexible curricula of active learning and the provision of alternative routes for learning as factors that enhanced their learning motivation and enabled effective learning (Kamal et al., 2020). The following hypothesis is therefore proposed in this study:

H1: Synchronous online learning has positive and significant effects on learning motivation.

Gu et al. (2019) revealed that e-learning could enhance learning interests in terms of information ability and satisfaction. They suggested that hospitals and clinics should reinforce computer information courses and software/hardware facilities through which nursing staff can acquire learning resources. Meanwhile, hospitals and clinics should consider purchasing additional technology equipment and establishing certificate specifications for standard courses to enhance employees' learning motivation and effectiveness. Oliveira et al. (2018) revealed that all participants in their study were satisfied or extremely satisfied with learning, after participating in cooperative learning aided by an e-learning platform. They agreed that online learning within a cooperative community makes learning more effective for members. All members completed case reports and met the required standard, indicating effective skill learning using the e-learning platform. Hopp et al. (2018) applied synchronous e-learning using the Internet to enable nursing colleagues' learning. The practical value of e-learning for nursing education was shown and nursing staff reported relatively enhanced satisfaction. As a result, the present study evaluates the following hypothesis:

H2: Learning motivation has significant positive effects on learning satisfaction.

Ha and Nguyen (2019) studied the relationship between learning motivation and learning satisfaction and discovered that learners with stronger participation motivation were more satisfied with the learning activity. Statistical analyses indicated significant positive effects of learning motivation on learning satisfaction, i.e., students with stronger learning motivation rated their learning satisfaction more highly. Yahia et al. (2018) discovered that learners' motivation before participation could better predict their satisfaction with teachers than their learning performance and progress. High satisfaction with electronic and distance education was not necessarily because of high motivation, while low satisfaction was mostly linked to low motivation (Layona et al., 2018). The following hypothesis is further proposed in this study.

H3: Synchronous online learning has a positive effect on learning satisfaction.

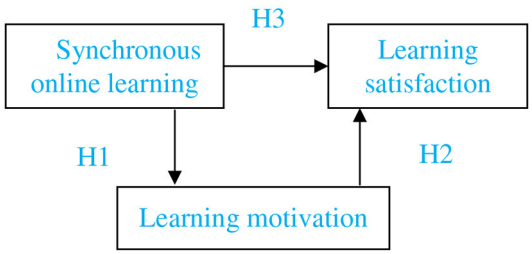

FIGURE 1 | Conceptual structure.

METHODOLOGY

The conceptual structure of this study is based on the literature review and is shown in **Figure 1**.

The contact persons for public sector units were contacted first to confirm that they have offered synchronous on-the-job online training learning before and were willing to distribute the questionnaire. To ensure that the sample composition was proportionate to the population, civil servants of all genders, seniority, grades, and titles were included and questionnaires were evenly distributed across these groups without concentrating on a single background or community variable. A written notice was then sent to the sampled public sector units together with the questionnaire.

Operational Definitions

Synchronous Online Learning

Chen and Tsai (2019) describe a synchronous online learning model in terms of role (instructors, learners), participation method (individual, group), participation location (designated location, random locations), interactive mode (one way, two way), and course delivery method (playing course recorded content, real-time instruction, mixed method). The five dimensions are explained below together with the relevant items included in our questionnaire.

Role

Synchronous online learning comprises instructor and learner roles, with the sole requirement that teachers and students have access to the virtual classroom at the same time. Items included: (1) Learners have greater autonomy in the learning process than in traditional education, (2) Instructors individually address learner characteristics in distance learning, and (3) Distance learning materials are designed to meet learners' needs.

Participation Method

The participation method of synchronous online learning includes individual and group learning. Students may participate in cooperative learning or group discussions supported by individual learning. Items focusing on the participation method included: (1) Learners can develop full self-control in the learning process, (2) Distance learning is a learner-centered learning style, and (3) Learners can learn according to personal needs in the learning process.

Participation Location

Participation in synchronous online learning can occur anywhere or in a designated location. Teachers and students may participate in online teaching and learning at locations that provide personal and flexible learning spaces and an environment tailored to their needs. Items included: (1) Learning is not restricted to time, (2) Synchronous online learning can take place anywhere, and (3) Time can be flexibly used for synchronous online learning.

Interactive Mode

Interactive mode refers to learning and interaction between teachers and students and among students. The interactive mode for synchronous online learning could be a one-way transmission, e.g., real-time multicast, or two-way interaction, e.g., online real-time discussion. Items included: (1) Teacher–student interaction can be achieved through various methods, (2) Learning is not affected by classmates, and (3) Synchronous online learning can rapidly provide sufficient interaction information.

Delivery Method

Synchronous online learning courses can be delivered by teachers playing recorded files, real-time online teaching, or a mix of the two approaches. Items included: (1) I can learn to use synchronous online learning by observing others use it, (2) The materials provided in synchronous online learning meet the learning needs, and (3) The operation response time of synchronous online learning is fast.

Learning Motivation

Referring to Kim et al. (2019), online learning motivation included usefulness and enjoyment in this study. The two dimensions are explained below together with an outline of the organization of questionnaire items.

Usefulness, a form of extrinsic motivation, refers to individuals using online learning to provide data for work or help solve problems. Items included: (1) Career promotion, (2) Learning knowledge and skills related to work, (3) Recognizing the importance of continuous learning in the working process, (4) Being open to relevant education because of changes in work, and (5) Promoting personal professional image.

Enjoyment, an example of intrinsic motivation, refers to the use of online learning because of feelings of happiness and satisfaction. Items included: (1) Enjoying learning new knowledge and new concepts, (2) Interest in the course, (3) Broadening horizons and enriching personal knowledge, (4) Learning new knowledge to compensate for inadequacies, and (5) Continuous development because of changing knowledge.

Learning Satisfaction

Referring to Chien et al. (2019), course content, teaching methods, and learning methods were used as the dimensions for measuring learning satisfaction in this study. The three dimensions and their organization are explained below.

Course content refers to new course knowledge, focusing on helpful content, and rich and diverse courses. Items covered were:

(1) It becomes natural to interact with learners or instructors through online teaching platforms, (2) The discussion in online learning is high quality, (3) It is easy to participate in discussions in online learning, (4) The interaction between instructors and learners in online learning is more difficult than in traditional teaching, and (5) I am satisfied with online learning.

Teaching method considers the evaluation methods used for assignments, multimedia-based teaching methods, teaching interactivity of courses, and lively teaching methods. Items included: (1) I am satisfied with online learning, (2) I would like to participate in online learning at any opportunity, (3) I think online learning is a smart decision, (4) I am satisfied with online learning, and (5) I think online learning meets my needs.

Learning method includes: the operation of interface, learning at home, learning time control, and repeatedly watching course content. Items included: (1) Compared with traditional teaching, I think the quality of online learning is better, (2) I think the quality of online learning is better than traditional teaching styles, (3) Compared with traditional teaching styles, learning becomes more difficult for me with online learning, (4) Compared with traditional teaching styles, the interaction among colleagues is easier in online learning, and (5) Compared with traditional teaching styles, participation in discussions is easier in online learning.

Research Sample and Participants

Supervisors and employees of Taipei City Government, Taiwan were the participants in this study. We distributed 360 copies of the questionnaire, and 268 valid copies were returned, giving a retrieval rate of 74%. The public sector units and their contact persons were first selected to confirm that the units had had exposure to synchronous on-the-job online learning before and were willing to distribute the questionnaire. A written notice was then sent to the sampled public sector units with the questionnaire.

Reliability and Validity

Confirmatory Factor Analysis (CFA) is an important part of Structural Equation Modeling (SEM). The measurement model should be tested before the two-stage model modification when using CFA for the structural model. When the model fit is acceptable, the second step of SEM can follow. In this study, the analysis of dimensions in CFA revealed factor loadings of 0.60–0.90, composite reliability of 0.70–0.90, and the average variance extracted (AVE) of 0.60–0.80, conforming to the standards of factor loading higher than 0.5; composite reliability higher than 0.6, and AVE higher than 0.5. The dimensions, therefore, indicate convergent validity.

RESULTS

Sample Structure

The sample structure is summarized in **Table 1**.

TABLE 1 | Sample structure.

Demographic variable	Item	No. of participants	Percentage %	Total
Grade	Supervisor	85	31.7	268
	Employee	183	68.3	
Gender	Male	153	57.1	268
	Female	115	42.9	
Age (years)	20 or younger	6	2.2	268
	20–30	74	27.6	
	31–40	103	38.4	
	41–50	55	20.5	
	51 and above	30	11.2	
Education	Junior High School	24	9.0	268
	Senior (Vocational) High School	36	13.4	
	University (College)	155	57.8	
	Graduate School	53	19.8	
Marital status	Unmarried (Including Single)	162	60.4	268
	Married	106	39.6	
Seniority	3 years or less	22	8.2	268
	3–5 years	97	36.2	
	5–8 years	75	28.0	
	8–11 years	33	12.3	
	More than 11 Years	41	15.3	

Structural Equation Model Analysis

SEM analysis includes fit analysis and overall explanatory power of the research model. Scholars typically refer to seven numerical indices used for testing the overall model fit, including chi-square (χ^2) test, χ^2-degree of freedom ratio, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), root-mean-square error (RMSEA), comparative fit index (CFI), comparative null model, and chi-square difference of independent model. The overall analysis results are presented in **Table 2**.

TABLE 2 | Model fit analysis.

Fit indices	Acceptable limit	This research model	Model fit judgment
χ^2 (Chi-square)	The smaller the better	22.183	
χ^2-degree of freedom ratio	<3	1.63	fit
GFI	>0.9	0.98	fit
AGFI	>0.8	0.87	fit
RMSEA	<0.08	0.03	fit
CFI	>0.9	0.95	fit
NFI	>0.9	0.93	fit

GFI, goodness of fit index; AGFI, adjusted goodness of fit index; RMSEA, root-mean-square error; CFI, comparative fit index; NFI, normed fit index.

When testing model fit, a smaller χ^2-degree of freedom ratio indicates better model fit. This research model showed a χ^2-degree of freedom ratio <3 (1.63). GFI and AGFI indicate better fit when close to 1 and have no absolute standard to judge the fit although GFI > 0.9 and AGFI > 0.8 are acceptable. GFI and AGFI were 0.98 and 0.87, respectively, in this research. A

TABLE 3 | Overall linear structural model analysis result.

Evaluation item	Parameter/evaluation standard		Result
Preliminary fit	Synchronous online learning	Role	0.67*
		Participation method	0.70*
		Participation location	0.69*
		Interactive mode	0.71*
		Delivery method	0.73**
	Learning motivation	Usefulness	0.74**
		Enjoyment	0.72**
	Learning satisfaction	Course content	0.77**
		Teaching method	0.75**
		Learning method	0.79**
Internal fit	Synchronous online learning→ learning motivation		0.88***
	Learning motivation→ learning satisfaction		0.83***
	Synchronous online learning→ learning satisfaction		0.85***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

good fit should show RMSEA less than 0.08—RMSEA was 0.03 in this study. The acceptable limit of CFI is >0.9—CFI in this study was 0.95. The normed fit index (NFI) should exceed 0.9—NFI in this study was 0.93. Overall, the goodness-of-fit indices conformed to the standards, revealing that the research results are acceptable. The sample data therefore could be used to explain the observation data.

From previous overall model fit indices, the model in this study presented favorable goodness-of-fit with observation data, showing that the theoretical model could fully explain the observation data. In this case, the correlation coefficients between synchronous online learning and learning motivation, learning satisfaction and the coefficient estimates could be further understood after the model fit test.

The research data are summarized in **Table 3**. The complete model analysis results reveal that five dimensions of synchronous online learning (role, participation method, participation location, interactive mode, and delivery method) could significantly explain synchronous online learning ($t > 1.96$, $p < 0.05$), two dimensions of learning motivation (usefulness, enjoyment) could notably explain learning motivation ($t > 1.96$, $p < 0.05$), and three dimensions of learning satisfaction (course content, teaching method, learning method) could effectively explain learning satisfaction ($t > 1.96$, $p < 0.05$). Thus, the overall model in this study presents good preliminary fit.

Regarding internal fit, synchronous online learning showed positive and significant correlations with learning motivation (0.88, $p < 0.01$). Learning motivation revealed positive and significant correlations with learning satisfaction (0.83, $p < 0.01$), and synchronous online learning appeared positively and significantly correlated with learning satisfaction (0.85, $p < 0.01$). Thus, H1, H2, and H3 are supported.

The results show positive and significant correlations between synchronous online learning motivation, aligned with the research of Ettinger et al. (2006), Gresty et al. (2007), and Cheng et al. (2013). Learning motivation also revealed significant positive correlations with learning satisfaction, corresponding to the research of Barron (2006), Morgan et al. (2006), and Kohn et al. (2008). Finally, synchronous online learning was positively correlated with learning satisfaction, conforming to the research of Freed and Dawson (2006), Hayes and Dearnley (2007), and Chen et al. (2008).

DISCUSSION

The enhanced network transmission quality and the continuous development of software and hardware meet the needs for synchronous on-the-job online training. However, the promotion of e-learning in domestic on-the-job training still requires asynchronous e-learning. This approach lacks learning attraction for in-service learners. To promote synchronous online learning, information needs to be provided to public sector staff. For effective synchronous on-the-job online training, public sectors should familiarize staff with the Internet platform interface and make them aware of possible problems they might encounter so that staff can gain maximal learning effectiveness. The synchronous online learning instructors could record the operation process before the courses and establish video files on the network platform for staff to review online any time to enhance their computer self-efficacy. Instructors could also guide individual staff to increase familiarity with the synchronous online learning environment and establish successful computer use two or three times before the course. The video files of such courses could be used to demonstrate the training for new staff. After creating an environment with the appropriate equipment, staff with stronger computer competence could be encouraged to integrate computer use into the work environment. Such computer use would then serve as a benchmark in the working environment and could induce a learning atmosphere. A strategic decision of this nature could efficiently assist a team by using the right personnel to undertake activities that maximize effectiveness (Rodríguez and Böhme, 2009).

The development of future technology might exceed our imaginations. Learning styles might change significantly, and teachers may no longer lead learning. Synchronous online learning in the public sector should therefore keep up with social trends (Cheng et al., 2011), with teaching content planned in a careful and relevant way. The curriculum design should be centered on personnel working in the public sector using technology and media to aid in their development, create an optimal learning environment, and reinforce learning effectiveness (Yeh et al., 2007).

CONCLUSION

Results revealed that public sector workers are motivated to participate in synchronous online learning, possibly because most staff cannot leave their work to participate in traditional on-the-job training. Synchronous e-learning is a convenient approach leading to greater motivation to participate in learning. As synchronous online learning can address the limits of traditional on-the-job training and tends to fit with the needs of staff, staff in the public sector show good learning satisfaction with online learning. These positive attitudes toward synchronous online learning mean that when difficulties are encountered they can be dealt with because of the belief in the ability to continue and make a success of their learning. Although staff might need to make considerable efforts, they typically do their best to achieve the goal and experience higher satisfaction.

Synchronous on-the-job online training is a new learning model for staff in the public sector and public sectors should establish comprehensive supporting measures to help employees fit the learning approach into their working day. Disciplinary actions and admonishment should be replaced with encouragement and support to eliminate a fear of the impact of computer technology and to further enhance the willingness to use computers. Previous research has often focused on online learning in schools but has rarely examined online learning in the public sector. The study discusses the effects of synchronous online learning on learning motivation and learning satisfaction in relation to public sector on-the-job training. We focused on actual learning conditions to reflect the real situation for public sectors that adopt or practice synchronous online learning in the future. The objective of this study was to determine the optimal learning program for on-the-job training in the public sector. The study contributes direction to researchers working in this area. Furthermore, this study can serve as a reference for academic research or practice. The Internet facilitates links between people and is becoming a mainstream medium for teaching practice. The practice of online learning can bring more benefits to more people. The research results contribute to the evaluation of the practicality of synchronous distance education for students in remote areas, different schools, and countries. The research helps to assess the benefits of the Ministry of Education's promotion of lifelong distance education and the distance education of general corporate employees. Synchronous online learning may be less suitable for the education and training of corporate employees, who might prefer self-study in their free time to make the learning more flexible.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

This study was reviewed and approved by the Ethics Committee of the Shih Hsin University. Written informed consent was obtained from all participants for their participation in this study.

AUTHOR CONTRIBUTIONS

NC performed the initial analyses and wrote the manuscript. I-JY assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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BRIEF RESEARCH REPORT
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A Study on Multimedia Integrated Pre-service Education to Learning Behavior and Competitiveness in Workplace of Employees in Hospitality

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The domestic situation of the past few years shows the practices of employees' unpaid leave and layoffs and the constant drain on capital, talent, and technologies in hospitality. Owners expect to reduce the losses to as low as possible by saving on human costs. Nevertheless, in face of such a changing environment, hospitality has to accumulate high-quality human capital through systematic investment, sensitive development, and continuous learning and growth to discover competitive advantages through the cultivation of human capital. The pre-service education of new employees could accelerate their familiarity with the operations of the company and their understanding of their job role and duties. More importantly, with good planning, it could make employees feel emphasized with and respected with the result of largely changing their thoughts and working habits. Aiming at supervisors and employees in hospitality in Zhejiang as the research objects, a total of 420 copies of our questionnaire are distributed, and 357 valid copies were retrieved, with a retrieval rate of 85%. According to the results to propose discussions, it is expected to generate systematic and proper education methods for the pre-service education in hospitality, promote the education effectiveness, and promote employees' capability and organizational performance.

Keywords: multimedia, pre-service education, learning behavior, competitiveness in workplace, hospitality, delicacy

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INTRODUCTION

Employees are the essential capital for hospitality or any organization where the managers have tried to reinforce human capital. Nonetheless, the domestic situation reveals the practice of unpaid employee leave, layoffs, and the constant drainage of capital, talent, and technologies in hospitality. Owners expect to reduce organizational losses to as low as possible by saving on human costs; however, hospitality should accumulate high-quality human capital through systematic investment, sensitive development, and constant learning and growth and find competitive advantages through

the cultivation of human capital. It is the primary issue for managers to transform knowledgeable employees into organizational assets. A talent shortage in an organization would affect the long-term management and even lose good business opportunities. In hospitality, the practice of education is the commonly used and broadly accepted method to reinforce human capital. In order to have the employees learn the skills required for their work, including the knowledge, skills, and behavior necessary to present excellent performance, education aims to have the employees master the competencies required for the work in education courses and apply these abilities to the work (Aarabi et al., 2013).

Under the development trends of globalization, technology, and a knowledge-based economy, hospitality puts a lot of stress on education-related issues in order to enhance the quality of human capital and promote employees' professional competency. For this reason, hospitality invests lots of resources in education, as pertains to whether pre-service education would develop the business' educational function and result in positive benefits. As a result, it could promote employees' competency by understanding and evaluating employees' competency gaps and designing and planning courses aiming bridging these insufficiencies before education begins. The pre-service education of new employees could accelerate their familiarity with company operations and understanding of their job role and work duties. More importantly, through good planning, it could make employees feel emphasized with and respected, with the result of largely changing their thoughts and working habits. Pre-service education demonstrates the meanings of positions and directions, i.e., assisting new staff in knowing their position and work direction. The content contains the points of the philosophy, objective, organization, policy, environment, and attendance regulations of the company to prevent new employees from reality shock when it comes to executing their actual work (Zumrah et al., 2013). Education is an activity of human resource development. Effective pre-service education could enhance personnel's ability to do better at work and properly develop to promote work performance. Along with the development wave of the hospitality industry, talent cultivation presents long-term development in the human resource strategy for the hospitality industry. As a result, long-term human resource planning and cultivation are particularly emphasized in the hospitality industry. Meanwhile, the human resource level is promoted from the operational and administrative level to the strategic level to enhance human resource managerial effectiveness and organizational performance. The development, utilization, and management of human resources become critical factors in human and socio-economic development (Paulsen et al., 2015). The possession of talent allows the hospitality industry to present a competitive ability to control the market. In order to retain and acquire talent, human capital and development should be emphasized (Saseen et al., 2017). Multimedia integrated pre-service education to teach behavior and competitiveness in the workplace of employees in hospitality is therefore studied, it is expected to clarify the effect of multimedia integrated orientation training on learning behavior and workplace competitiveness as well as to show systematic and proper education methods for the orientation training in the hospitality industry in order to enhance the educational effectiveness and promote employee ability and organizational performance.

LITERATURE REVIEW AND HYPOTHESIS

Chen et al. (2017) revealed that a hospitality organization could enhance employees' learning behavior by providing them with pre-service education or encouraging further study. Aiming at staff receiving pre-service education within a year, Kimzey et al. (2019) revealed that those participating in pre-service education presented higher learning behavior after the education and regarded the education as the welfare and being able to enhance the competency. Deci et al. (2017) proposed significant correlations between personality traits and learning behavior that managers in hospitality could arrange different pre-service education according to employees' personality traits to enhance the learning behavior. Looking at social workers of non-profit organizations in Kaohsiung, Wijma et al. (2018) found positive effects of pre-service education on social workers' learning behavior.

Lee et al. (2018) regarded remarkably positive correlations between learning behavior and competitiveness in the workplace of employees in the iron and steel industry with high explanatory power and notably positive effects. Looking at employees in Taiwan and China, Mirani et al. (2019) pointed out the positive effects of employees' learning behavior on the organizational commitment to affect the competitiveness in the workplace. Gholamzadeh et al. (2018) revealed that employees with better outcomes of on-the-job education showed higher learning behavior and better competitiveness in the workplace. Gehrman et al. (2018) discovered that grass-root employees with learning behavior, in finance, would enhance the competitiveness in the workplace at work, i.e., there was a notably positive relationship between learning behavior and competitiveness in the workplace of grass-root employees in finance.

Rickard et al. (2009) stated that employees receiving pre-service education would enhance work efficiency and quality of employees' work performance and further promote the competitiveness in the workplace. Annear et al. (2017) discovered that most people could learn knowledge and skills in pre-service education for the application to the work as well as to enhance personal ability. Mastel-Smith et al. (2019) found a difference in pre-service education between Taiwanese companies and American companies; however, pre-service education showed positive effects on competitiveness in the workplace in both Taiwanese and American companies. Mavounza et al. (2020) considered that securities specialists, in order to cater to environmental changes, would enhance their competitiveness in the workplace after participating in cross-business pre-service education to show remarkably positive correlations between pre-service education and competitiveness in the workplace.

METHODOLOGY

Research Framework

Summing up the above literature review, the conceptual framework (**Figure 1**) is drawn to discuss the relations between

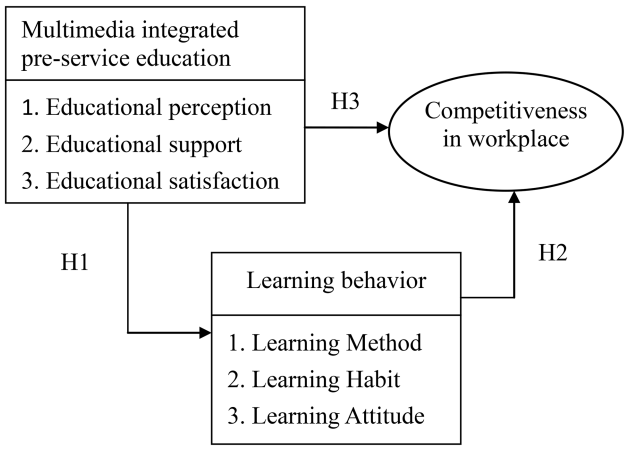

FIGURE 1 | Conceptual framework.

multimedia integrated orientation training, learning behavior, and competitiveness in the workplace.

Research Questions

According to the above literature review and conceptual framework, the following research issues are acquired.

H1: (Hypothesis 1): Multimedia integrated pre-service education shows positive and significant effects on learning behavior.

H2: (Hypothesis 2): Learning behavior reveals positive and remarkable effects on competitiveness in the workplace.

H3: (Hypothesis 3): Multimedia integrated pre-service education shows positive and notable effects on competitiveness in the workplace.

Operational Definition

Multimedia Integrated Pre-service Education

Referring to the education scale developed by Chan and Leung (2020), three dimensions of educational perception, educational support, and satisfaction with education are contained in this study.

Learning Behavior

Referring to the learning behavior scale proposed by Bi et al. (2019), learning behavior is divided into "learning method," "learning habit," and "learning attitude" in this study.

Competitiveness in Workplace

Referring to the competitiveness in the workplace scale proposed by Wang et al. (2018), competitiveness in the workplace is measured with a single dimension in this study.

Research Sample and Object

The Zhejiang Food and Beverage Industry Association implements the catering and cooking business policy of "inheritance, development, development, and innovation," which positively develops the construction of "three fame engineering" (famous restaurants, famous cooks, and famous dishes), organizes provincial and municipal cooking technology competitions in a planned way, participates in national cooking technology competitions and world Chinese cooking competitions, and develops activities of Zhejiang cuisine skills training and exchanges inside and outside the province to develop the important function for the prosperity of hospitality market and the development of Zhejiang dishes. Aiming at supervisors and employees in hospitality in Zhejiang, a total of 420 copies of our questionnaire were distributed, and 357 valid copies retrieved, with a retrieval rate of 85%.

Reliability and Validity Test

Confirmatory Factor Analysis (CFA) is an important part of SEM that the measurement model of the structural model should be tested before the two-stage model modification. When the model fit is acceptable, the second step SEM model evaluation is preceded. The CFA reveals the factor loadings of dimensions in 0.60~0.90, the composite reliability in 0.70~0.90, and the average variance extracted in 0.60~0.80, conforming to the standards of (1) factor loadings > 0.5, (2) composite reliability > 0.6, and (3) average variance extracted > 0.5. The dimensions, therefore, present convergent validity.

RESULTS

Structural Model Analysis

The structural model analysis contains the goodness-of-fit analysis of the research model and the explanatory power of the overall research model. In this case, seven numerical indices are used for testing the goodness-of-fit of the overall model, including the chi-square (χ^2) test, χ^2-degree of freedom ratio, the goodness of fit index, adjusted goodness of fit index, root-mean-square error, comparative fit index, comparative hypothesis model, and chi-square of the independent model. The overall results are organized in **Table 1**.

From the above indices, when using the χ^2-degree of freedom ratio for testing the model, the ratio is better smaller; this research model shows the χ^2-degree of freedom ratio <3 (1.94). GFI and AGFI are better close to 1, have no absolute standards to judge the fit, and GFI >0.9 and AGFI >0.8 are acceptable; this research model reveals GFI and AGFI 0.96 and 0.83, respectively. RMSEA being in 0.05–0.08 stands for a good model and reasonable fit; this research model shows RMSEA of 0.05. The allowable standard of CFI is >0.9, and this research model shows CFI as 0.92. NFI should be at least higher than 0.9, and this research model reveals the NFI is 0.91. Overall speaking, the goodness-of-fit indices conform to the standards, revealing the model to be acceptable. The research data therefore could explain the actual observed data.

TABLE 1 | Research model fit analysis.

Fit indices	Allowable range	This research model	Model fit judgment
χ^2 (Chi-square)	The smaller the better	17.68	
χ^2-degree of freedom ratio	<3	1.94	Match
GFI	>0.9	0.96	Match
AGFI	>0.8	0.83	Match
RMSEA	<0.08	0.05	Match
CFI	>0.9	0.92	Match
NFI	>0.9	0.91	Match

From the above-mentioned overall model fit indices, the model structured in this study and the observed data present a favorable fit, revealing that the theoretical model could fully explain the observed data. Consequently, after the model fit test, the correlation coefficient and coefficient estimate of multimedia integrated pre-service education to learning behavior and competitiveness in the workplace could be understood. The research hypothesis test results are shown in **Table 3**.

The research data are organized in **Table 2**. The overall model analysis results show that three dimensions of multimedia integrated pre-service education (educational perception, educational support, and satisfaction with education) could significantly explain multimedia integrated pre-service education ($t > 1.96$, $p < 0.05$), three dimensions of learning behavior (learning method, learning habit, and learning attitude) could remarkably explain learning behavior ($t > 1.96$, $p < 0.05$), and competitiveness in the workplace presents the notable explanation ($t > 1.96$, $p < 0.05$). The overall model appears to present a good preliminary fit.

Regarding the internal fit, multimedia integrated pre-service education shows positive and significant correlations with learning behavior (0.81, $p < 0.01$), learning behavior reveals positive and remarkable correlations with competitiveness in the workplace (0.86, $p < 0.01$), and multimedia integrated pre-service education shows positive and notable correlations with competitiveness in workplace (0.83, $p < 0.01$). H1, H2, and H3 are therefore supported. The research hypothesis test results are shown in **Table 3**.

From the research results, multimedia integrated orientation training presents positive and significant effects on learning behavior (0.81, $p < 0.01$), showing that H1 is supported. Apparently, in order to cope with environmental changes, the hospitality industry applies multimedia integrated orientation training to promote employees' learning behavior, i.e., remarkably positive effects of multimedia integrated orientation training were found on learning behavior. Learning behavior shows positive and remarkable effects on workplace competitiveness (0.86, $p < 0.01$), meaning that H2 is supported. In this case, when the hospitality industry is able to provide relevant multimedia integrated orientation training courses, the employees feel that the organization is taking care of and is responsible for them. Consequently, employees would present more rigorous learning behavior for the affirmation of self-capability to further promote workplace competitiveness. Finally, multimedia integrated orientation training reveals positive and notable effects on workplace competitiveness (0.83, $p < 0.01$), showing that H3 is supported. Apparently, in a time with multiple knowledge-based economies, the hospitality industry promotes multimedia integrated orientation training to enhance employees' professional knowledge and skills or encourages employees to cultivate learning behavior in order to promote workplace competitiveness.

TABLE 2 | Overall linear structural model analysis result.

Evaluation item	Parameter/evaluation standard		Result
Preliminary fit	Multimedia integrated pre-service education	Educational perception	0.70*
		Educational support	0.67*
		Satisfaction with education	0.75**
	Learning behavior	Learning method	0.69*
		Learning habit	0.73**
		Learning attitude	0.71**
Internal fit	Multimedia integrated pre-service education → learning behavior		0.81***
	Learning behavior → competitiveness in workplace		0.86***
	Multimedia integrated pre-service education → competitiveness in workplace		0.83***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

TABLE 3 | Hypothesis test.

Research hypothesis	C	Empirical result	*p*	Result
H1	+	0.81	<0.01	Supported
H2	+	0.86	<0.01	Supported
H3	+	0.83	<0.01	Supported

DISCUSSION

Under the premise of satisfying customer requirements, hospitality should present sufficient and excellent professional technology and develop selectively. The enhancement of customer satisfaction should result in a repeat visit and even a recommendation to friends. On the contrary, dissatisfied customers might not visit again and might urge others not to visit. Since professional technology and sensitive development are so important, multimedia integrated pre-service education should be particularly emphasized. With existing bases, enhancing personal professional technology would promote the competitiveness in the workplace. Businesses in the hospitality industry are suggested to positively and effectively establish a training program and system for trainers as well as understand orientation-training related instructional methods and communication skills with orientation training lecturers to further promote the teaching quality of internal orientation training (Hyndman and Pill, 2017). As a result, experts and scholars could be invited to participate in the practical lectures and professional technology demonstration of multimedia integrated pre-service education to instruct and correct the employees'

professional technology and sensitivity development and promote competitiveness. In order to have their personal ability be affirmed, the employees in hospitality would make efforts and learn professional technology and related professional knowledge from multimedia integrated pre-service education. In this case, preceding learning behavior for the application to customer needs and enhancing customer satisfaction to promote work performance and competitiveness in the workplace would enhance the career development of the employees in hospitality as well as the coherence. Employees in the hospitality industry should regularly check and promote hardware facilities and attempt to apply interactive multimedia interactive teaching and materials or other relevant educational equipment or teaching media to stimulate the employees' learning willingness and interests as well as achieve the training objective and further enhance training effectiveness (Appleby et al., 2016). For instance, they can utilize audiovisual teaching for self-learning, i.e., using electronic equipment of films, video files, and recorders for delivering teaching content. It is suggested that the hospitality industry, in addition to stressing employees' educational training, should list constant expenses for purchasing educational training-related equipment to promote educational effectiveness (Cullen, 2016).

CONCLUSION

The research results reveal positive effects of multimedia integrated orientation training on learning behavior and workplace competitiveness of employees in the hospitality industry. Employees could learn better and utilize more professional technology in pre-service education; once the professional technology is promoted, the learning behavior would be enhanced. The research results reveal the greater the learning behavior of employees in hospitality, the larger the competitiveness in the workplace. Employees being willing to participate in learning behavior and further make extra efforts for the learning behavior would enhance competitiveness in the workplace. The research results reveal that employees in hospitality attending more multimedia integrated pre-service education would present stronger competitiveness in the workplace. Hospitality requires professional technology and skills that the employees have to regularly participate in relevant technology study or on-the-job education courses for discussion and exchange with each other. It could enhance professional skills and further promote customer satisfaction and loyalty to help the promotion of competitiveness in the workplace. Roetert and Jefferies (2014) mentioned that there was not "the best" training method, but merely "the most suitable" method. Any training courses to achieve the training objective with multiple training methods would show higher effectiveness than those with merely one method. With similar research results to this study, French et al. (2015) revealed that multimedia integrated orientation training presented better assistance to the effectiveness of employees in the hospitality industry. Accordingly, the orientation training objects and the required skills, knowledge, or attitude should be carefully considered in the construction of orientation training content and planning of orientation training programs before the practice of orientation training courses. Proper orientation training methods are then selected with appropriate orientation training materials and relevant teaching to achieve the expected orientation training effectiveness (Kilcommins and Spain, 2016).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

This study was reviewed and approved by the ethics committee of the Zhejiang Yuexiu University. Written informed consent was obtained from all participants for their participation in this study.

AUTHOR CONTRIBUTIONS

C-HP and Y-LW: collected and analyzed the data and drafted the manuscript. YS: designed the research protocol and contributed to the literature review. T-KH: reviewed the manuscript and revised the manuscript. All authors revised and approved the submitted version of the manuscript.

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Digital Literacy During COVID-19 Distance Education; Evaluation of Communication-Based Problems in Line With Student Opinions

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INTRODUCTION

The COVID-19 pandemic, which started in the People's Republic of China in late 2019 and spread across the world at the beginning of 2020, has affected the health sector as well as other areas of activity worldwide (United Nations Educational Scientific Cultural Organization[UNESCO], 2020). The field of education has also been one of the areas that has been rapidly and significantly affected by the pandemic. Education and training activities carried out in all countries of the world within a certain plan and system for many years have had to undergo methodical changes in this process, and with the support of developing technology, education, and training activities at all levels from kindergarten to higher education have been moved to the computer environment (Zhong, 2020).

In times when technology was not sufficiently advanced, distance education was performed *via* mail and on demand; however, it has now moved to the internet environment with the support of rapidly developing technology, and teacher–student communication has started to take place through various technological devices, which have become mandatory during this period. Distance education processes, which have been frequently seen and experienced during the pandemic period, require a certain level of access to technology in today's conditions and the ability to use this technology correctly, known as digital literacy (Lankshear and Knobel, 2015; Metin Taş, 2019).

The history of the phenomenon of "distance education," which refers to situations where the education is carried out by the teacher and the student in separate physical environments (Akdemir, 2011), dates back to the eighteenth century; it is known that the announcement of stenography courses through distance education published in the Boston Gazette in 1728 was the first recorded example of distance education (Kırık, 2014). The distance education process, which began in the form of education by letter, continued with radio, television, teleconferences, cassettes, faxes, video conferences, and finally, the internet (Karagöz, 2019). It is seen that education that started in the computer environment over the internet has now transitioned to mobile devices with the development of mobile communication technologies (Yamamoto and Altun, 2020). The teaching style, which used to be defined only as "teaching by letter," has now started to be characterized by different names such as "learning at home," "open education," and "distance education" (Aşkar and Altun, 2006). In the cases where the time allocated for education is limited, distance education is a teaching approach that allows the education process to continue (Tekedere, 2014). Distance education also helps to realize equal opportunities in education by enabling a standardized but tailored education to a wider audience at a lower cost without time and space restrictions (Telli, 2018).

The concept of distance education first appeared in Turkey between 1924 and 1927 and subsequently began to develop (Alkan, 1997). Letter teaching institutions and the open education

system are the first examples of distance education in Turkey. During the pandemic period, formal education in Turkey and Northern Cyprus, as in the whole world, was moved to the Internet and television. This situation required the availability of the aforementioned electronic devices and internet access, as well as students, parents, and teachers having "digital literacy" skills.

"Digital literacy" can be defined as the ability to recognize, use, manage, analyze, and synthesize digital resources and tools, create new information, and communicate with others in this way (Martin, 2005), in addition to being able to use different information and communication technologies in daily life and educational processes. It refers to a wide set of skills including the functions of being able to access, produce, and share accurate information in the virtual environment (Hamutoğlu et al., 2017). According to Eshet (2002), digital literacy is a special and different way of thinking and not only includes the ability to obtain information over the internet but also the capacity to choose from and evaluated the information found. According to Gilster (1997), who first defined the concept of digital literacy, it is a special way of thinking, which not only includes pressing keys but also mastering the concept of the digital environment. It is not considered a new version or alternative to traditional literacy; in order to exist in today's world in the norms of work, education, learning, and social life, it is a phenomenon that complements traditional literacy (Churchill et al., 2008).

Researchers have evaluated both the positive and negative aspects of the contributions of digitalization to the education and training processes, which have become particularly important to exist in today's world. According to the researchers, the inclusion of digital technologies in education increases socialization and collaborative work (Baker, 2000), and provides rapid access to pre-written ready-made information and material on all the subjects *via* the Internet. However, the rapid access to information leads distracts them from creativity causing individuals to be lazy as everything is prepared for them (Evering and Moorman, 2012). The reliability of the information in the digital environment (Baker, 2000) and the increased likelihood of plagiarism (Scanlon and Neumann, 2002) are also among the negatives that may be caused by the digital environment. It is noted that these negativities may be due to the nature of technology and another important reason is the lack of digital literacy skills (Onursoy, 2018). It is seen that it is important to develop digital literacy skills in order to properly benefit from digitalization. Student–teacher communication in the education process comes to the forefront in the transformation of digitalization in the education process into positive and useful digital literacy skills.

Communication processes play an active role in the transition of the individual born and raised in society from a biological existence to a social existence (Tuna, 2014). The concept of communication, which can be defined as the process of sharing knowledge, thoughts, feelings, attitudes, and skills (Oğuzkan, 2003) between a message source and a target in order to change behavior, is viewed from the point of view of the education process; the interaction process between the student and the teacher, which takes place within a certain curriculum and where the purpose of changing behavior is at the forefront. While teacher–student communication is also face-to-face in traditional education, in distance education, this communication takes place through technological tools such as computers, televisions, telephones, and teleconference systems. This can lead to different communication problems than in face-to-face training.

Elcil and Sözen-Şahiner (2014) listed the barriers to the distance education process as being disruptive, constructive, channel-sourced, personal, physical, technical, psychological, temporal, student-induced, and educator-induced barriers. Student communication problems include situations such as the student's reluctance to communicate with the faculty member, the inability to ask questions, or the lack of interest in the course. Educator communication problems include late responses to the students' questions or no answers at all, unfair behavior when evaluating students, and excessive authoritarian attitudes. All these elements have various levels of impact on student and teacher communication in the distance education process.

In this process, where the structure and nature of the distance education process are different from face-to-face education, it is clear that the communication between the student and the teacher will develop in different forms from the face-to-face training process. It is thought that the digital literacy skills of the students in this communication process will affect the communication process. The main purpose of this study is to examine and demonstrate the digital literacy skills of the students in the distance education process, which has become not a choice but a necessity for the whole world as a result of the pandemic.

METHOD

In the research, the case study technique, which is one of the qualitative research methods, was used. The research data were collected through a structured interview form prepared by the researchers. While preparing the research questions, the necessary corrections were made by taking the opinions of two academicians who are experts in the field. The research data were collected through digital platforms. The study group consisted of 23 students from the Near East University Faculty of Communication, Radio, Television, and Cinema Department. Participants were determined by the purposeful sampling technique. Participation in the research was carried out on a voluntary basis. It was stated to the participants that their identifiable information would be kept confidential and would only be used within the scope of the research. The content analysis method was used in the interpretation of the data. The data obtained by the content analysis were classified by coding and the same topics were collected under similar themes. Participant opinions are given in quotation marks and italics. In order to ensure the anonymity of the participants, each participant was identified as S1, S2, etc. **Table 1** showed that the demographic characteristics of the participants.

FINDINGS AND DISCUSSION

The research findings are shown in **Table 2**. The research participants were asked for what purpose they used digital

TABLE 1 | Demographic and communication tools used distribution of participants.

	N%	%
Gender		
Female	6	26
Male	17	74
Age		
19–24 years	16	70
25–29 years	5	21
30 years and older	2	9
Education level		
Undergraduate	22	96
Master		4
Distance education accessing format		
Mobile phone	6	27
Tablet	1	5
Personal PC	15	68

education and online platform applications communicatively during the pandemic process. The opinions of the participants included for the purpose of communicating with family, friends, and teachers (n21), following the country and world agenda (n16), learning the latest information about the disease (n12), following the developments related to my interest/department in which I am studying (n12), chat and entertainment purposes (n11), watching movies, listening to music, etc. (n11), participating in discussions and commenting (n4), and spending time (n6). When the responses of the participants were examined, it was found that they used digital education and online platform applications to communicate with their family, friends, and teachers the most.

When the participants compared the pre- and post-pandemic period, the participants were asked what the positive and/or negative elements were with respect to communication in the process of education, and the positive responses of the participants were collected under 4 sub-themes and their negative responses were collected under 6 sub-themes. The positive opinions of the participants are as follows: face-to-face education was more effective before the pandemic (n6), student-centered education (n7), increased communication (n1), and opportunity to study and follow courses (n2). Negative opinions were: increased homework/projects (n4), difficulty in communicating (n9), lack of hands-on courses (n1), lack of motivation/uncertainty (n3), technological infrastructure (n3), and difficulty in communicating (n5). The expressions of the participants in this direction are as follows:

> *"I don't think there are any positives. The negative was not being motivated, and not being able to ask my teachers questions if I find the time and watch it again." S3*

> *"With the increase in the assignments and projects that I see as positive, we are directed toward research. Negatively, communication and the atmosphere of the course are not like in the classroom"* S11

The participants were asked about their communication patterns with family, friends, and the environment in the pre-pandemic period, and their responses were collected in 3 sub-themes. These were the ability to meet with everyone at any time (n14), to attend family/friend events (n15), and to communicate more frequently (n12). The opinions expressed by the participants in this direction are as follows:

> *"I was in touch with so many friends and we would meet all the time. After the pandemic started, we did not have the opportunity to meet with anyone face-to-face, communication decreased."* S23

> *"Since I study abroad, my parents and I were on the phone and it didn't change much. According to the degree of closeness with my friends and other people, we used to do activities in places such as visiting each other's homes, going to cafes, cinemas and restaurants."* S3

In continuation of this question, participants were asked about the differences in the communication processes with family, friends, and the environment during the pandemic. Participants expressed the views of not meeting people (n10), not organizing/participating in activities (n8), we started seeing each other at home (n4), social distancing and hygiene rules were effective (n6), and online meetings increased (n12). Some participant's statements included:

> *"After the pandemic started, some of my friends returned to their hometowns. I stayed in Cyprus with a small number of my friends. Although it is not a social activity, we started meeting at home."* S5

> *"Communication only happens through social networks. That's the number of people I meet online. We video chat every day."* S7

When the pre- and post-pandemic periods were compared, it was asked what the positive and negative elements were in terms of communication. Positive expressions of the participants in this direction were collected under 6 sub-themes, while negative expressions were collected in 4 sub-themes. Positive statements included: communication was warmer before (n2), communication was more frequent (n4), environmental sensitivity increased (n2), compliance with the rules increased (n6), and communication became more frequent (n4). On the other hand, negative statements included: psychological difficulties (n6), increased internet addiction (n5), communication lost (n3), and financial difficulties (n2). The statements made by the participants included:

> "*The positive side of this process is that we don't meet people and spread the disease any more. The downside is that we are going through psychologically difficult period because we have not met with anyone.*" S1

The recommendations put forward by the participants for the remote communication process after the pandemic are as follows; studies should be carried out in this direction (n1), people were distanced (n3), infrastructure should be improved (n7), face-to-face education should be transitioned (n5), empathy should be developed (n2), and crisis management training should be given (n2). The participants' recommendations are as follows:

TABLE 2 | Digital literacy in distance education given during COVID-19; student opinions on communication-based problems.

Theme	Sub-theme		*n*	%
Digital education and the use of online platform applications for communication purposes during the pandemic	To communicate with my family, friends and teachers		21	23
	To follow the country and world agenda		16	17
	To keep track of developments related to my interest/department in which I am studying		12	13
	For gaming, chat, entertainment purposes		11	12
	For the purposes of watching movies, listening to music, etc.		11	12
	To participate and comment in discussion		4	4
	To pass the time		6	6
Positive and/or negative factors with regard to communication in the process of education, compared to the pre-pandemic period	Positive	Before, face-to-face training was more effective.	6	38
		Student-centered education	7	44
		Communication increased	1	6
		Opportunity to study and follow courses	2	12
	Negative	Increased of assignments/projects	4	13
		Difficulty to communicate	9	29
		Lack of hands-on lessons	1	3
		Lack of motivation/uncertainty	3	10
		Technological infrastructure	3	10
		Attendance at the class has become difficult	5	26
Communication with family, friends and the environment in the pre-pandemic period	To be able to communicate with everyone at any time		14	34
	Participate in family/friend events		15	37
	We used to communicate more often.		12	29
Differences in communication processes with family, friends and other people during the pandemic	Not being able to meet		10	25
	Not organizing/participating in events		8	20
	We started seeing each other at home.		4	10
	Social distancing and hygiene rules were effective		6	15
	Increased conversations online		12	30
Positive and negative factors with regard to communication process compared to the pre-pandemic period	Positive	Not to see each other so as not to spread the disease	2	8
		Communication was warmer before	6	25
		Not much has changed	4	17
		Environmental awareness has increased	2	8
		Compliance with the rules has increased	6	25
		Communication has become more frequent	4	17
	Negative	Psychological difficulties	6	38
		Internet addiction has increased	5	31
		Communication lost	3	19
		Financial difficulties	2	13
Recommendations for the post-pandemic remote communication process	Studies should be carried out in this direction		1	5
	It causes people to be distanced		3	15
	Infrastructure must be improved		7	35
	Transition to face-to-face training must be ensured		5	25
	Empathy must be developed		2	10
	Crisis management training should be provided		2	10
Effects of digital education and online platform elements on communication processes between people	Interest in digital education and online platforms has increased		7	17
	Internet and social media are being actively used		14	34
	Negative psychological effects have emerged		2	5
	Technological dependence increased		11	27
	Success is achieved		2	5
	Information pollution has increased		4	10
	Communication is weakened		1	3

"Many people had problems with the introduction of distance education during the pandemic. Unfortunately, both the reasons for the infrastructure problems in the country and the lack of access to distance education have damaged the right of individuals to receive equal education. I think that the infrastructure should be improved and every student should have access to the courses." S9 Ramos-Morcillo et al. (2020) emphasized that one of the downsides of distance education is that students do not have equal rights.

"I think face-to-face education is more efficient and effective. There must be ways to transition to face-to-face education." S21

The participants were asked what the effects of digital education and online platform elements were on communication processes between people. The participants stated these effects included increased interest in digital education and online platforms (n7), internet and social media started to be

actively used (n14), negative psychological effects appeared (n2), technological dependence increased (n11), success was achieved (n2), information pollution appeared (n4), and communication was weakened (n1). Some participants stated:

"With the move of education to digital platforms, people started to use the internet and social media more. Dependence on technology has increased." S13

"The use of technology has increased a lot and everyone has had something to say about the events that have happened, and so information pollution has emerged. What information is correct is being questioned." S18

CONCLUSION, DISCUSSION, AND RECOMMENDATIONS

During the COVID-19 pandemic, evaluations were made in line with student opinions in order to convert the students' thoughts and processes into positive in the problems based on distance education digital literacy, and communication. In addition to the finding that the student expectations in the education process have not adequately been met, the level of digital literacy is also considered inadequate to understand the educational infrastructures. Many studies in the literature have investigated the effects of COVID-19 on education. As a result of the researchers' studies, it has been revealed that communication is one of the leading problems in this process for students and lecturers (Basilaia and Kvavadze, 2020; Dhawan, 2020; Petretto et al., 2020; Huang et al., 2020). The research shows parallelism with the literature in line with the findings.

It is also seen from the results obtained from the student opinions that the absence of students from the regional location, economic difficulties, and comfort also play an important and negative role in educational saturation. Among the findings of the study, the phenomenon of miscommunication in the learning process of individuals and feelings of isolation and inadequacy were highlighted. Studies have supported these findings. It is stated that during this process, learners experience communication problems while trying to adapt to the new educational environment (Can, 2020; Daniel, 2020; Telli and ve Altun, 2020). In addition to all these negative findings, the positive element is also indicated as the possibility of replaying the trainings irrespective of time or location in line with student opinions on digital platforms.

One of the most important indicators of this process is that there are infrastructure and communication problems. It is recommended to introduce planning and development practices in order to follow new technologies in distance education and to provide equal opportunities to students in this direction. It is recommended to adapt distance education technologies to education programs. Seminars and in-service training programs for distance education and technologies can be organized for all the stakeholders of education. This research was carried out with the participation of university students. The same research can be repeated with the participation of primary, secondary, and high school students and the findings can be compared.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary files, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Near East Ethical Committee Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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BRIEF RESEARCH REPORT
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Critical Factors in the Implementation of Risk Awareness Education in Universities in China

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Under the influence of social changes, latent factors in campus safety are increasing, and dealing with them is becoming more difficult. Facing the challenges in the pluralistic society, students need to cope with the changes of external and internal environments in the dynamic society. Additionally, there are new events on campus at any time, which may lead to campus risk. The frequent events that have occurred on campus in recent years have created difficulties for school administrative units. Implementing campus risk management strategies and conducting risk awareness education campaigns are, therefore, necessary. The fact that we are in a technologically dynamic age is another factor that makes risk awareness and proper risk management essential for individual survival and sustainable development of organizations. The participants of the study were university students in Nanchang, Jiangxi Province. Three hundred copies of the questionnaire were distributed, and 238 valid copies were retrieved, representing a retrieval rate of 79%. The results of the survey show that "life education" is the most emphasized dimension, followed by "curriculum and instruction," and "environmental planning." The five most emphasized indicators among the 14 indicators are opportunity education, physical activity, role-play, team competition, and learning area planning. The results suggest that school administrative units can take control in an emergency and reduce the likelihood of school members being threatened or harmed by the risk factor, and educators can make a quick decision to turn risk into opportunity.

Keywords: universities in China, campus risk, risk awareness education, critical factor, curriculum and instruction

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INTRODUCTION

A campus that is considered peaceful may hide a great potential for risk. As society changes, the latent factors for campus safety are increasing at the national level, and dealing with them is becoming more and more difficult. Facing the challenges in the pluralistic society, students must cope with the changes of external and internal environments in the dynamic society. Additionally, there are new events on campus at any time, which may lead to campus risk. Maslow placed physiological needs at the bottom of the hierarchy, and then, safety needs, which means that people had to satisfy the lowest physiological needs, including water, food, sleep, and homeostasis, before they could satisfy the safety needs, i.e., personal safety, for survival. The safety needs are urgently

needed after the basic physiological needs were satisfied (Öznacar, 2018). The basic survival needs included physical safety and psychological safety, so a lack of safety in life would not satisfy other needs beyond safety needs and could have great threats and effects on personal survival. Safety was the fundamental survival need, but people applied different standards to "safety." In a negative sense, safety meant having no hazards or accidents and being safe. Positively, safety meant seeking and applying viable strategies to avoid accidents and achieve safety (Bilgin and Öznacar, 2017). Consequently, the implementation of risk management strategies on campus and risk awareness education is necessary. The fact that we are in a technologically dynamic age is another factor that makes risk awareness and proper risk management essential for individual survival and the sustainable development of organizations.

As for the latent factors of campus safety, people, relationships, time, places, and objects on- and off-campus should be highlighted. For students, student safety was based on their concept of safety, knowledge, attitude, and behavior. In summary, student safety refers to safety management in the students' environment, protection, and prevention of possible accidents, teaching relevant safety knowledge to students, and creating a safe, warm, and harmonious learning environment (Aspiranti et al., 2011). Based on the above opinions, one can understand the importance of safety for people. Positive prevention measures should be taken for students based on the idea that prevention is better than cure to reduce the probability of emergencies and accidents. The importance and measures of safety should be promoted in time from students' life experience to learn the proper safety concept and behavior, cultivate the ability of safety analysis and prediction of hazards in the environment, and reduce unrealistic risk behaviors to ensure safety (Welch, 2018). The possibility of potential dangers in each of these components should not be ignored, and the continuous improvement of vigilance can help to face a danger calmly and not panic in case of serious injury. Schools used to be organizations with higher internal stability and fewer extrinsic factors; however, in this case, school educators often lacked the awareness of unexpected developments, believing the low likelihood of major events on campus. In addition, the campus is a very loosely organized place, and many risk events on campus are traceable before they break out. Frontline education personnel should, therefore, have a thorough understanding of the causes of campus risk events to take preventive measures in advance. This study discusses factors in the implementation of risk awareness training in Chinese universities, with the expectation that school administrative units can take control and reduce the likelihood of school members being threatened or harmed by the risk factor and that educators can make a quick decision to turn risk into opportunities, which are the critical roles.

LITERATURE REVIEW AND HYPOTHESIS

Campus Risk

Kim et al. (2018) considered safety as the basic need of an individual and the cornerstone of an organization, from individual health to the survival and development of the world. Nam (2017) considered that any event that causes a school to temporarily stop its activities can be a campus risk. Schools need to be alert and find immediate solutions to maintain the usual school operations. Chary et al. (2019) referred to campus risk as risk events that occur on campus. School faculty and staff, as well as students, are the assets under care when taking action. Campus risks are unsafe or unexpected situations, events occurring on- or off-campus that affect the normal operation of the school organization or seriously threaten the psychological or physiological health of teachers and students and require effective control and management within a short period of time. Hernandez-Suarez et al. (2019) defined "campus risk" as any event or situation that occurs on campus or is associated with campus members that result in disruption, pressure, and injury to school members and cannot be effectively and immediately resolved with existing school manpower and resources. Alpi and Evans (2019) regarded it as events that occur on- or off-campus that result in faculty, staff, and students being at risk due to the factors regarding school safety. Classroom accidents, natural disasters, faculty and staff misconduct, severe corporal punishment, and major conflicts even affect school operations. In terms of who is affected, López et al. (2018) noted that teachers and students in schools can experience the greatest impact, but communities and even the public can also be affected. Unlike other organizations, a school is a place of care and instruction that cannot be closed simply because of risk events.

Risk Awareness Education

Hetu et al. (2018) pointed out that it is the responsibility of caregivers to provide students with safety-related knowledge. Next to family, school is the most important interaction and learning place for students. In this respect, parents and teachers are responsible for protecting students and providing them with knowledge about their safety. Paulik et al. (2019) suggested teaching students to risk awareness to develop a deeper understanding of accidental injuries, understand how to protect themselves when in danger, pay attention to safety measures in life, reduce safety problems caused by human negligence or mistakes, and develop the habit of taking precautions. Bellamy et al. (2019) explained the importance of risk awareness training as guiding students to effectively and correctly assess the whole environment, helping them to develop a deeper understanding of living with the habit of safety and promoting the understanding and prevention of accidental injuries according to safety cognition and alertness. Lin et al. (2017) mentioned that risk awareness education aims to prevent the occurrence of accidental injuries and to teach students to ensure physical and psychological safety, as well as to avoid unwanted or accidental injuries. Nickerson et al. (2019) stated that risk awareness education does neither mean threatening children nor does it expect children to learn how to get out of danger after being hurt, but it emphasizes and encourages a positive attitude toward establishing safety, uses positive communication, and protects them by setting an example. Gunawan et al. (2019) indicated that the importance and objective of risk awareness education are to prevent students from unexpected injuries and to maintain their

physical and psychological safety, as well as to teach them to understand accidental injuries, pay attention to the environment, and avoid danger.

Factors in Risk Awareness Education

Young et al. (2017) conducted a study on risk awareness education and divided the strategies commonly used in teachers' practice in risk awareness education into three areas: environmental planning, curriculum and instruction, and life education. These applications are described below.

Environmental Planning

(1) Planning a safe classroom: This dimension refers to keeping the classroom environment healthy and clean and paying attention to ventilation systems, smooth movement, good lighting, comfortable temperature, and adjusting classroom decoration to each subject. (2) Planning a specific activity area: Teachers plan different activity areas and places, e.g., the location near the whiteboard, sticking lines on the floor, arranging students' seats and activity area during classroom events, arranging table manners, planning nap space, and removing dangerous materials from the environment. (3) Planning a suitable learning area: This dimension refers to clearly defining the boundaries of each learning area in students' learning environment, establishing an appropriate activity and allocating a space of the same size for each learning area, separating dynamic and quiet learning areas, developing learning area's play rules and other related rules to be discussed between teachers and students, and understanding students' use and boundaries of the learning area, as well. (4) Examining the safety of facilities and teaching aids: Facilities and teaching aids in the area must meet safety standards. Teachers and caregivers should regularly review the conditions of use of the facilities for safety and should make sure that the teaching aids are appropriate for students' age. Planning for a safe environment can reduce the number of accidents, but flexibility for change allows students to learn in a good and safe environment (Pranata et al., 2019).

Curriculum and Instruction

(1) Group discussion: During classroom activities, teachers can provide students with risk awareness through group discussion, setting rules, autonomous class rules, and instructions to ensure that students understand safety-related knowledge, can develop sensitivity to environmental problems, can recognize possible risks in the living environment, and can establish positive behavior habits to reduce unsafe behaviors, as well as can let students gain insight into the different ideas through group discussion to improve the safety-related awareness and learn self-protection methods and resilience. (2) Exercise: Teaching students escape methods and proper behavior in the event of an earthquake or other disaster, teachers can show children the horror of disasters and show them the escape method and route to escape in school to deepen children's perspective through role-plays and exercises. (3) Games and team competitions: Students enjoy games. The most important activity from the perspective of school children is "play" because games and imagination are the best teaching tools for them. (4) The use of music, song, and dance: Teachers can use music, song, and dance as media to support the instructional processes of risk education. For example, they can inform children about activities by starting with music or attract students' attention by wrapping the content of risk education in interesting songs or accompanying it with dance movements to deliver the lesson and promote effective teaching. (5) The use of picture books and cards: Stories or situations are important ways for preschool children to acquire knowledge and experience because this teaching method can promote language development and increase imagination and creativity. (6) The use of audiovisual instructional media: Teachers can use various audiovisual equipment, such as films, educational videos, and radios, to teach students about the concept of safety and promote safety cognition, as well as to discuss possible responses to an accident together.

Life Education

Instructional strategies in life education include the followings. (1) Teachers setting an example: Using examples is better than abstract instructions. Students in the learning phase would like to imitate the language or behavior of adults, and teachers are the role-model in schools. (2) Student role-play: Teachers can initiate risk awareness education through role-playing and use peer relations, e.g., providing models and having students assist in the instructional processes to give children a specific and permanent learning paradigm to learn proper safety behaviors and further cultivate safety habits. (3) Prior individual counseling and opportunity education: When children have unsafe behavior or reveal some behaviors related to safety, teachers can discuss with students about safety issues through individual guidance or opportunity education. They can teach them proper risk awareness and the right safety knowledge and behavior. (4) The use of picture prompt strategy: Teachers can use picture prompts in risk awareness education, such as turning arrangements created collaboratively by teachers and students into pictures or displaying pictures as posters to decorate the environment, so that students can see them at any time to promote peripheral learning. (5) Application of demonstration prompt strategy: During risk awareness education, students should know and understand the safety factors, and the learning objectives can be demonstrated and taught through opportunity education. (6) The use of reinforcement strategy: Teachers usually apply reinforcement strategies to support the teaching of risk awareness education, including concrete rewards or encouragement and praise (Takahashi et al., 2018).

METHODOLOGY

Research Method

Turner (2017) pointed out the common methods to confirm critical success factors as (1) regression analysis, (2) factor analysis, (3) Delphi method, and (4) Analytic Hierarchy Process (AHP). Brian (2017) suggested using the Analytic Hierarchy

TABLE 1 | Overall weight of factors in risk awareness education in universities in China.

Dimension	Hierarchy 2 weight	Hierarchy 2 sequence	Indicator	Overall weight	Overall sequence
Environmental planning	0.258	3	Classroom planning	0.046	11
			Activity area planning	0.066	8
			Learning area planning	0.088	5
			Facility examination	0.030	14
			Teaching aid safety	0.034	13
Curriculum and instruction	0.335	2	Group discussion	0.040	12
			Exercise	0.108	2
			Team competition	0.095	4
			Application of teaching material	0.074	7
			Audiovisual media	0.050	10
Life education	0.407	1	Making oneself an example	0.055	9
			Role-play	0.100	3
			Opportunity education	0.131	1
			Instructional strategies	0.083	6

Process to collect the opinions of scholars, experts, and participants through group discussions to simplify complicated problems into simple elements and to calculate the contribution or priority of compositions in a hierarchy that corresponds to the elements in the previous hierarchy. Sindhu et al. (2017) explained after the objective interview with the relevant department supervisors that the goals and tasks are first confirmed based on the management program. They added that the individual critical success factors are then proposed according to the individual's practical experience and needs. The critical success factors to achieve the goal are selected, organized, and sequenced based on analyses so that resources can be effectively distributed in the critical factors. Finally, indicators are established for the effectiveness of the practice.

An expert opinion survey was conducted in this study. Given the problems of mean, decision attributes, and group decisions, inaccuracies in the traditional Delphi method, the Fuzzy Delphi method (FDM), and the Analytic Hierarchy Process (AHP) were used for the data analysis in this study to determine the precise critical factors in the practice of risk awareness education of universities in China.

Analytic Hierarchy Process (AHP): After integrating expert opinions, a hierarchical system was constructed from complicated decision-making systems developed through hierarchies to clarify problems. Various dual judgments were complemented by pairwise comparisons to evaluate the importance of factor weights.

Establishment of Indicator

The questionnaires in this study were emailed to experts in various fields. The initial expert feedback was organized by considering universities in China that teach risk awareness education. Such considerations with similar properties were classified and sent back to the experts to get their opinions. After several rounds of email inquiries, the major classification was achieved. An expert meeting was called to discuss the critical factors in universities in China, which include risk awareness education, environmental planning, curriculum and instruction, and life education. These critical factors were used as AHP dimensions, and the corresponding classifications were used as the basis for creating the AHP questionnaire. The following research principles were revised using the Delphi method.

(1) Environmental planning: classroom planning, activity area planning, learning area planning, facility examination, teaching, and safety.
(2) Curriculum and instruction: group discussions, exercises, team competitions, the use of teaching materials, and audio-visual media.
(3) Life education: role modeling, role-playing, opportunity education, and instructional strategies.

Research Objective

In recent years, with the rapid development of society and economy in China, students are exposed to an increasingly harsh social environment and enormous pressure in terms of learning, life, adjustment, emotion, and employment. Students might easily face psychological problems and even experience serious psychological risks. In this case, universities should constantly teach risk awareness to strengthen students' risk immunity.

With the participation of university students in Nanchang, Jiangxi Province, this study investigates public risk awareness, prevention and response ability, and public risk awareness education in universities. A total of 300 copies of the questionnaire were distributed, and 238 valid copies were retrieved, representing a retrieval rate of 79%.

RESULTS

After completing hierarchical weighing, the distribution was calculated based on the relative importance of the indicators in various hierarchies to reveal the importance of the indicators in the entire system and the overall weight of factors in the

TABLE 2 | Weights in Hierarchy 3.

Dimension	Indicator	Overall weight	Hierarchy sequence
Environmental planning	Classroom planning	0.046	3
	Activity area planning	0.066	2
	Learning area planning	0.088	1
	Facility examination	0.030	5
	Teaching aid safety	0.034	4
Curriculum and instruction	Group discussions	0.040	5
	Exercises	0.108	1
	Team competitions	0.095	2
	Application of teaching materials	0.074	3
	Audio-visual media	0.050	4
Life education	Role modeling	0.055	4
	Role-play	0.100	2
	Opportunity education	0.131	1
	Instructional strategies	0.083	3

TABLE 3 | Top five indicators.

Indicator	Overall weight	Overall sequence
Opportunity education	0.131	1
Exercise	0.108	2
Role-play	0.100	3
Team competition	0.095	4
Learning area planning	0.088	5

universities in China that conduct risk awareness education was calculated (**Table 1**).

DISCUSSION

The administrative units in universities can apply life education during the orientation training of teachers and caregivers so that they can teach students about the possible risks and implement the curriculum to instruct students about the thematic order of risks for the training of risk awareness education's practice strategies. After the training, the effectiveness of learning the contents of risk awareness education should be reviewed so that teachers can gain professional knowledge and skills related to risk management to implement on campus as needed. Disaster prevention exercises should be reinforced and implemented so that students can remember how to cope with risks and disasters and can respond calmly to sudden risks and disasters. Teachers can try different instructional strategies, utilize community resources, and invite experts, teachers, and caregivers for the cooperation to teach risk awareness using the appropriate methods, in which students are interested to deepen their impression, allow them to have multiple experiences, and implement their safety knowledge. Educational administrative units can compile booklets on crisis awareness education (Öznacar and Dagli, 2019). These can be illustrated with short and concise text and graphics so that they are easy for teachers to read and remember (Cowan and Rossen, 2013). This can enrich teachers' pedagogical knowledge of the field and inform crisis awareness education (Mulvaney et al., 2012). In terms of designing the curriculum for students' risk awareness education, administrative units in universities can enhance teaching and training for the application of group discussions, games, and picture books or cards. Furthermore, thematic training on risk awareness education can be held to help the teachers improve the practices of group discussion, games, and picture books or cards to meet the needs of students in the teaching environments and to strengthen the implementation of students' risk awareness education. In addition, teachers can ask, discuss with, or learn from other teachers with different experience backgrounds to build collaboration. Sharing experiences, exchanging knowledge, and reflecting after practice can promote professional knowledge and skills in risk awareness education and facilitate implementation in the classroom. It is also important to ensure that teachers implement crisis awareness education. With this in mind, field research and academic practices in crisis awareness education can be used to examine how the teaching is occurring in the field. Teachers can understand the importance of crisis awareness education through appropriate supervision, evaluation, and assessment (Bosworth et al., 2011). Since schoolteachers are busy with their coursework and school administrative matters, the unfamiliarity with the content of crisis management training on campus would lead to the neglect of crisis management on campus (Özdemir, 2012; Estep, 2013). In this case, the higher education administrative unit can establish a special crisis office to implement a specific division of labor, review the adequacy of schools' crisis awareness education programs, and ensure the smooth operation of crisis teams. Regular dissemination of crisis awareness education at schools and sharing experience would have more real effects than schools working behind closed doors. Besides the actual needs of schools to be reviewed and depending on the promotion of crisis awareness education in schools, the budget should be adjusted accordingly to support the promotion of crisis education on campus and various crisis education activities (Howat et al., 2012; Lalonde and Roux-Dufort, 2013).

CONCLUSION

In this study, the AHP was used to analyze the data. The nature of the interaction between dimensions through the ultimate hierarchy was observed. Accordingly, the nature of the impact of each dimension on the alternatives was determined. Accordingly, the following conclusions were drawn from the results of the empirical analysis.

Among the dimensions in Hierarchy 2, "life education," was the most emphasized dimension with a weight of 0.407, about 40.7% of overall weight, followed by "curriculum and instruction" (weighted 0.335), and "environmental planning" (weighted 0.258). Accordingly, risk awareness education was the most emphasized dimension for universities in China implementing life education.

For the indicators of the dimensions in Hierarchy 3, the hierarchical weights were sequenced as below (**Table 2**).

1. Indicators in environmental planning were ordered as learning area planning, activity area planning, classroom planning, teaching aid safety, and facility examination.
2. Indicators in curriculum and instruction were sequenced as exercises, team competitions, application of teaching materials, audio-visual media, and group discussions.
3. Indicators in life education were sequenced as opportunity education, role-play, instructional strategies, and role modeling.

Based on the weighing of critical factors in universities in the implementation of risk awareness education in Chinese universities, the top five indicators (**Table 3**) were ranked as opportunity education, exercise, role-play, team competition, and learning area planning, among the 14 indicators.

It is important for teachers to implement crisis awareness education in universities (Sullivan et al., 2011). For this reason, it is necessary to hold crisis awareness courses on campuses regularly and emphasize the differences between each area to plan different course content depending on how little faculty know about crisis management strategies on campus, and how different the dilemmas are in crisis awareness on campuses. Crisis prevention and recognition is the most important element of crisis cognition education. Besides, specific workable crisis response plans should be developed with crisis management manuals for all teachers detailing standard operating procedures for crises, with the definite division of labor and the establishment of a phone tree to quickly complete personnel notification and information transfer during crisis events.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the Ethics Committee of the Nanchang University, with written informed consent being obtained from all the participants. All the participants were asked to read and approve the ethical consent form before participating in the present study. The participants were also asked to follow the guidelines in the form in the research. The research protocol was approved by the Ethical Committee of the Nanchang University.

AUTHOR CONTRIBUTIONS

LL and XP performed the initial analyses and wrote the manuscript. YH and XL assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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BRIEF RESEARCH REPORT
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Effects of Multimedia Audio and Video Integrated Orientation Training on Employees' Organizational Identification and Self-Efficacy Promotion

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This study investigates the instructional effectiveness of multimedia audio and video integrated pre-service education. In addition, the effects of pre-service education on organizational identification and self-efficacy promotion are discussed. The participants of the study consist of 264 supervisors and employees in the high-tech industry. The results revealed statistically significant positive effects of pre-service education on employees' organizational identification and self-efficacy. The effect of employees' organizational identification on self-efficacy promotion was also significantly positive.

Keywords: multimedia education, organizational commitment, education and training, satisfaction with education, regression analysis

INTRODUCTION

The quality of human resources is key for an enterprise to gain an advantage in the competition (Ngoma and Dithan Ntale, 2016). As is the case in investment, enterprises should consider their benefit in education and training as well. The evaluation of the effectiveness of training programs is a primary issue. This is because, based on the results of the evaluation, enterprises can invest more resources to the enhancement of the quality of their workforce to take a step forward in the competition. In a society with a knowledge-based economy, learning is a source of power for the continuous progress of individuals, organizations, and society as well as a method of maintaining the advantage in competition (Onyishi et al., 2015). A company can improve the internal quality of their workforce and increase its competitiveness through various training programs. In addition to enhancing employees' knowledge and skills at work and changing employees' job attitude, education and training can be utilized for the future development of individuals and organizations (Koen et al., 2013). Education and training used to be used for work-related needs or urgently needed manpower. However, orientation training is now utilized to develop a more positive job attitude of employees for better work performance. It is broadly utilized in practice.

Traditional face-to-face courses are commonly used for the education and training of internal employees. Traditional teaching, being restricted to teaching materials, is relatively dull. Traditional

training programs fall short in arousing learners' interests. Modern enterprises should consider the application of multiple learning methods to satisfy employees' learning needs and enhance the effect of learning with the help of multiple learning styles (Chen and Lim, 2012). Traditional learning styles with education and training were therefore impacted by the emergence of e-learning. They changed the nature of training programs in enterprises. With the popularity of the Internet, multimedia audio/video integrated learning styles are gradually replacing training in traditional classrooms. Many enterprises are starting to implement multimedia information technologies to respond to market changes rapidly and enhance their competitiveness. In order to increase employees' learning efficiency, education and training has been transferred into multimedia audio/video environments. In addition to reducing labor costs for enterprises, employees' learning is more flexible without the restrictions of time and place (Sylva et al., 2019).

Steven et al. (2016) indicated that organizations instructing their employees in professional knowledge through digital education and training can enhance professionalism and conformity while facilitating the willingness and integration of employees. Dechawatanapaisal (2018) also revealed that many enterprises tended to deliver professional knowledge to the employees through education and training to enhance corporate competitiveness and employees' self-worth. Through these programs, they indirectly improve their employees' sense of identity, cohesion, and connection with the company as well as enhancing employees' self-efficacy and effectively improving their talents. For this reason, traditional orientation training might not satisfy employees' needs. An enterprise should design a new orientation training model to make the employees be aware of themselves, be able to face challenges, and serve enthusiastically. In this way, they can further build their personal value and vision while hitting their targets. It is further discussed in this study that enhancing employees' involvement in work, organizational identification, and satisfaction with self-efficacy promotion can be achieved through a newer model of training. Most of the previous research on the use of multimedia audio/video in education focused on the discussion of school education (Lohmann and Frederiksen, 2018; Kincey et al., 2019; Matsiola et al., 2019; Mei et al., 2019; Ocak and Baran, 2019) but rarely discussed education and training in enterprises. However, research indicated that employees participating in education and training can improve in terms of productivity (Becker, 1962; Smith and Kenyon, 2005; Zieba and Zieba, 2014), ability and knowledge (Mann and Robertson, 1996; Huang, 2001), and self-efficacy (Mann and Robertson, 1996). Nevertheless, previous literature scarcely mentioned improving the effectiveness of training styles nor the enhancement of employees' job involvement, organizational commitment, and satisfaction with self-efficacy. The effect of multimedia audio and video integrated orientation training on employees' organizational identification and self-efficacy promotion was investigated in this study. The results of the study are expected to help enterprises to practice orientation training effectively, enhance the internal operation efficiency, and successfully implement human resource development.

LITERATURE REVIEW AND HYPOTHESIS

Multimedia Audio/Video Teaching

Matsiola et al. (2019) defined multimedia audio/video teaching as teaching with materials commonly presented with texts (including printed text or dictated text) and images (containing illustrations, pictures, photos, maps, animation, or images). Multimedia audio/video learning referred to learning with texts and pictures. Multimedia audio/video learning was also called dual-code learning or dual-channel learning. In other words, multimedia audio/video presentation referred to messages being sent *via* texts and pictures. Multimedia audio/video teaching message or multimedia teaching presentations aid learning with the presentation of texts and pictures (Kincey et al., 2019). Mei et al. (2019) considered multimedia audio/video integrated teaching as computer multimedia audio/video or network technology. Such media technology had the advantages of digitalization, audio/visual sound and light multiple stimulation, easy access, fast processing, and convenience in communication. The implementation of integration meant the integration and application of teaching, i.e., being used as a teaching tool. Ocak and Baran (2019) explained that computer multimedia audio/video integrated teaching did not simply refer to teachers being able to use computers; it referred to teachers being able to more effectively achieve the instructional objectives with the help of computers. Lohmann and Frederiksen (2018) pointed out multimedia audio/video integrated teaching as the integration of information technologies into curricula, materials, and instruction in order to make the information technology become a vital teaching and learning tool for teachers and students. In addition, the use of information technology has become a part of daily teaching activity in classrooms.

Multimedia Audio/Video Teaching Theory and Application

The information communication model was originally designed by Shannon and Weaver in 1949–1963 for industrial design. The application of one-way communication was then applied to teaching to explain the learning process (Hsu, 1999). Analyses revealed that, when explaining teaching processes with the Shannon-Weaver message model, the data of teachers, textbooks, speeches, music, or graphic images were the message sources, and each type of data could provide messages in various fields. However, different types of data sources could affect communication, i.e., the selection of teaching media (Hsu, 1999).

In the process of the communication model, it is clearly understood that the "source" is the first element in the entire communication process; in other words, the source of the communication message, which can be any persons or organizations. "Encoding" is the second element of communication. It is used in the process of changing the thought, data, or feeling, and is delivered from the source in the form of various symbols or behaviors understandable by senses. The message is the third element of the communication model. "Encoded" messages should be delivered through a selected

"channel," which is the fourth element. Various audiovisual media could be the "channel." "Decoding" is the fifth element of the model. When a message is delivered from the channel to the destination, the recipient has to convert and reverse such symbols to correctly understand the message content. The "receiver," as the sixth element of communication model, sends another message, after receiving the message. The purpose of this message is to ensure that the source understands the communication. It is the feedback mechanism.

Since people have different experiences due to their diverse educational and cultural backgrounds, effective communication can be generated in the "mutual experience" between source and receiver (Chang and Chu, 1998). In education, the theoretical research and practical application of communication should not be restricted to the surface message delivery of language or symbols. It should also contain the meaning of cultural message, machine message processing interface, human feeling, message processing in cognitive psychology, as well as the mutual effects between understanding the meaning and communication styles.

Teachers use different teaching media to find the clearest and most ideal communication channel with students. Students, on the other hand, can clearly understand the course content, and concept through the delivery of media material information. The selection of the most appropriate teaching media to achieve teaching goals is an important direction to follow. Relatedly, teachers need to understand the properties and characteristics of various teaching media in order to make the best of the auxiliary teaching materials and achieve the learning goals.

Research on Orientation Training and Organizational Identification

Bi et al. (2019) explained orientation training as reinforcing employees' knowledge, skills, and attitude through planned and systematic instruction. They added that it is the guidance to enhance work efficiency and ability in the application of knowledge to daily work. High awareness of organizational support can promote employees' positive emotional integration of the organization and mean they devote their effort toward organizational profits. Sylva et al. (2019) regarded the creation of organizational performance through organizational identification. Employees who are aware of more profits shared in the organization can reveal organizational identification. The orientation training, as a way of intangible profit making, allowed the growth of employees beyond salaries. Employees who are aware of the gained profits can enable positive emotional connection with the organization and develop organizational identification. Georgiou and Nikolaou (2019) mentioned that the practice of orientation training can compensate for the gap between business performance and human resources of enterprises to a large extent. Additionally, it can improve employees' lack of ability at work and enhance their professional knowledge. Furthermore, employees can explore their potential through orientation training to find the motivation for self-efficacy promotion and further facilitate the organizational identification. Accordingly, the following hypothesis is proposed in this study.

> H1: Orientation training has significant positive effects on organizational identification.

Research on Organizational Identification and Self-Efficacy

Fox et al. (2018) considered that employees with organizational identification can be highly motivated at work. They have a sense of pride and are willing to promote their self-efficacy to achieve the objectives at work. Kucherov and Manokhina (2017) stated that enterprises or organizations which are able to practice effective orientation training can enrich employees' knowledge of management and professional technology, change their job attitude, and enhance organizational identification and loyalty. These, in turn, enhance the overall organizational performance. Meanwhile, the practice of employee education and training was the best way for an enterprise to improve the employees' job competency, reinforce their production skills, and allow them to develop competency in the organizational system. As a result of this, the employees' self-efficacy is promoted and they achieve the company-set objectives. Moke et al. (2018) indicated that training employees through effective orientation training can enrich employees' management knowledge and professional technology, change their job attitude, and cultivate organizational identification and loyalty to the company. In addition, it enhances the overall performance of the organization to further develop the enterprise and acquire corporate competitiveness. Accordingly, the following hypothesis was proposed in this study.

> H2: Organizational identification presents significantly positive effects on self-efficacy promotion.

Research on Orientation Training and Self-Efficacy Enhancement

Byun and Ha (2019) mentioned that orientation training, based on the needs at work or for businesses, aimed to facilitate the individual skills or knowledge to achieve the preset requirements. They stated that it is a learning program for employees to learn work-related knowledge and technology. In addition, they mentioned that it is related to the ability development to enhance work performance, and they specifically emphasized the shaping of skills and methods. In the same vein, Al-Swidi and Yahya (2017) considered that orientation training aimed to improve employees' working ability and to enable their immediate engagement in the new work environments which included adapting to new products, working programs, policies, and standards. In addition to the emphasis on performance, Peeters et al. (2019) regarded orientation training as the basis of teaching a certain model since employees naturally tend to perceive that training as standard. Training in the beginning when a newcomer is unaware can help employees understand the basic form and standard model. It emphasized the education and training of new employees. An enterprise providing more education and training can help the employees improve their motivation and self-efficacy to contribute to their understanding and promote

their performance. According to the above-mentioned literature the following hypothesis was developed:

> H3: Orientation training has significantly positive effects on self-efficacy promotion.

METHODOLOGY

Conceptual Architecture

Based on the literature on theory and application, the conceptual framework of this study was drawn (**Figure 1**).

Operational Definition

Orientation Training

The education and training scale in this study refers to the one developed by Schmidt (2007). In this scale, the perception of training, organizational support for training, and satisfaction with training are included.

Organizational Identification

The organizational identification scale in this study refers to the definition and scale proposed by Mael and Ashforth (1992).

Self-Efficacy Promotion

The self-efficacy promotion scale in this study is the revised version of the scale proposed by Renkema et al. (2009). This scale contained the intention to participate in work-related and career-related development activities.

Research Object

Sampled Object

The high-tech industry in Hsinchu Science Park was determined as the sample of this study. The industrial development in Hsinchu Science Park focuses on the integrated circuit, computer and peripherals, telecommunications, optoelectronics, precision machinery, and biotechnology. Since its establishment, the government has invested large amounts of funds in the software/hardware construction. It rapidly developed due to the convenient transportation and nice working environment as well as nearby academic and research institutions, such as National Yang Ming Chiao Tung University, National Tsing Hua University, and Industrial Technology Research Institute.

Questionnaire Retrieval

Supervisors and employees in high-tech industries were included in the research sample. The firms were determined with random sampling from industries in integrated circuit, computer and peripherals, telecommunications, optoelectronics, precision machinery, and biotechnology announced by Hsinchu Science Park. Among the enterprises in the industry, the ones applying multimedia audio/video integrated orientation training were randomly selected as the samples. They were distributed 50 copies of the questionnaire each. In total, 300 copies were distributed. The questionnaire was distributed and collected on site. A total of 264 valid copies were retrieved, with a retrieval rate of 88%.

Analysis Method

Regression analysis was used in this study to understand the relations among orientation training, organizational identification, and self-efficacy enhancement. Through regression analysis, the effects of independent variables on dependent variables as well as independent variables on intervening variables and dependent variables were tested in this study. Regression analysis was utilized for the general understanding of the relationships among major variables of orientation training, organizational identification, and self-efficacy enhancement in this study. It was also used with a view to verify the existence of the effect.

RESULTS

Reliability and Validity Analysis

According to Kaiser (1958), the evaluation standard for convergent validity should conform to four principles: (1) The eigenvalue of the extracted factor must be higher than 1; (2) the measured items in dimensions must be convergent to a common factor; (3) the factor loadings of the variables must

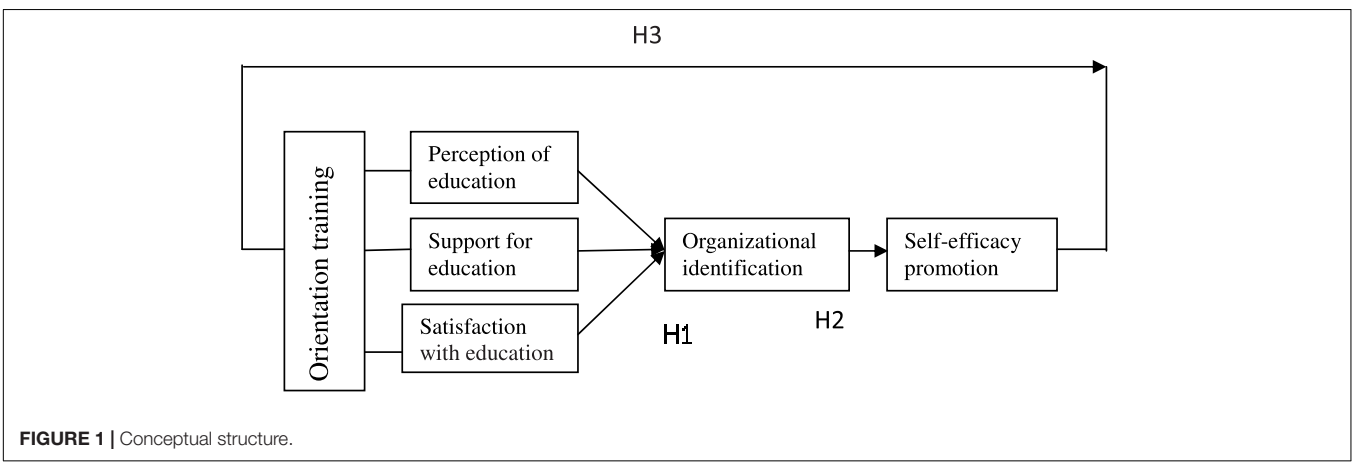

FIGURE 1 | Conceptual structure.

be higher than 0.5; and 4. the cumulative variance explained must achieve 50%.

Gaski and Nevin (1985) indicated that the evaluation standards for discriminant validity should conform to two principles: (1) The correlation coefficient of the paired variables must be significantly smaller than 1, and (2) the correlation coefficient between any two dimensions must be smaller than Cronbach's α of a single dimension.

Orientation Training

Cronbach's α was used as a test of reliability in this study and was designed to measure orientation training. Through Cronbach's α, the stability and consistency of items in the scale were tested. After the factor analysis, three factors were extracted. The first factor, "perception of education" (eigenvalue = 2.332, α = 0.95), had factor loadings of 0.958, 0.952, 0.950, and 0.771. The second factor, "support for education" (eigenvalue = 5.349, α = 0.94), had factor loadings of 0.954, 0.948, 0.947, and 0.754. The third factor, "satisfaction with education" (eigenvalue = 2.588, α = 0.94), had factor loadings of 0.964, 0.961, 0.955, and 0.717. The cumulative covariance explained by the three factors reached 85.578%. According to the results of the analyses, it can be stated that orientation training showed convergent validity in this study.

The correlation coefficients of the dimensions of orientation training were found to be between 0.242 and 0.314. The correlation coefficient between any two dimensions was smaller than Cronbach's α of an individual dimension. The results indicated that there existed discriminant validity among dimensions.

Organizational Identification

Cronbach's α was used to test the reliability of the organizational identification measurement instrument in this study. It was used to check the stability and consistency of the items in the scale. After factor analysis, one factor (eigenvalue = 4.970, α = 0.96) was extracted, with factor loadings of 0.935, 0.924, 0.906, 0.902, 0.898, and 0.894. The cumulative covariance explained reached 82.832%, which showed the convergent validity of organizational identification.

Increasing Self-Efficacy

The consistency of the items developed to measure the self-efficacy in the scale was tested using Cronbach's α as a reliability test. After factor analysis, one factor was extracted (eigenvalue = 5.434, α = 0.98), and the factor loadings were found as 0.960, 0.956, 0.956, 0.949, 0.946, and 0.942. The cumulative covariance explained achieved 90.570%. The results revealed a convergent validity of self-efficacy.

The Influence of Orientation Training on Organizational Identification

To test H1, VIF < 10 shows no collinearity. The analysis results in **Table 1** revealed that the perception of education (Beta = 0.286***), support for education (Beta = 0.222***), and satisfaction with education (Beta = 0.162**) showed significant effects on organizational identification. Therefore, it can be concluded that H1 was supported.

TABLE 1 | Analysis of the relationship between orientation training and organizational identification.

Dependent variable → Independent variable↓	Organizational identification	
Orientation training	**Beta**	**P**
Perception of education	0.286***	0.000
Support for education	0.222***	0.000
Satisfaction with education	0.162**	0.005
F	27.650	
Significance	0.000***	
R^2	0.242	
Adjusted R^2	0.233	

***p < 0.01, ***p < 0.001.*
Self-organized in this study.

TABLE 2 | Analysis of orientation training, organizational identification, and self-efficacy promotion.

Dependent variable → Independent variable↓	Self-efficacy promotion			
Orientation training	**Beta**	***P***	**Beta**	***P***
Perception of education	0.382***	0.000		
Support for education	0.206***	0.000		
Satisfaction with education	0.171**	0.002		
Organizational identification			0.582***	0.000
F	41.312		134.079	
Significance	0.000***		0.000***	
R^2	0.323		0.339	
Adjusted R^2	0.315		0.336	

***p < 0.01, ***p < 0.001.*
Self-organized in this study.

The Influence of Orientation Training and Organizational Identity on Self-Efficacy Promotion

Correlation Analysis of Orientation Training and Self-Efficacy Promotion

When testing H3, VIF < 10 showed no collinearity. The analysis results, which can be seen in **Table 2**, revealed significant effects of perception of education (Beta = 0.382***), support for education (Beta = 0.206***), and satisfaction with education (Beta = 0.171**) on self-efficacy promotion. Based on these results, it can be stated that H3 was supported.

Correlation Analysis of Organizational Identification and Self-Efficacy Promotion

When testing H2, VIF < 10 showed no collinearity. The analysis results in **Table 2** revealed significant effects of organizational identification (Beta = 0.582***) on promoting self-efficacy. Therefore, H2 was supported.

DISCUSSION

Orientation training in high-tech industries can enhance employees' organizational identification. High-tech businesses with orientation training can help their employees develop high organizational identification. Employees in high-tech industries receiving more frequent orientation training will have a deeper understanding of work execution to enhance their organizational identification. Employees in high-tech industries who identify themselves as members of the organization and agree with the organizational mission will regard the success of the organization as personal success. With stronger organizational identification, they can promote their self-efficacy more positively which, in turn, enhances personal performance, and enables them to achieve the organizational goals. Orientation training can enhance the willingness of employees' self-efficacy promotion. Employees' self-promotion can be the tool to increase the organizational value. The development in workplaces can facilitate organizational effectiveness and help the company to maintain a competitive advantage, which promotes the outputs of human resources (attitude, behavior, and human capital), organizational performance (performance and productivity), and financial performance (profit and financial indicators) (Maurer et al., 2003; Tharenou et al., 2007). For this reason, employees' self-promotion provides significant contribution to organizational learning and knowledge-based competition (Tharenou et al., 2007). Employees positively engaging in continuous self-promotion to prevent their skills from falling short remain attractive to employers (Moos, 2009; Mustamin, 2012). It was also understood that understanding the incentives for self-promotion can help the organizations facilitate self-promotion. High-tech businesses with orientation training will have employees who show stronger willingness of self-efficacy promotion. High-tech businesses should regularly examine or improve the hardware facilities. Additionally, they should attempt to apply multimedia audio and video interactive teaching and materials or some relevant training facilities and teaching media. In this way, they can stimulate employees' learning intention and interests in orientation training and achieve the objective of orientation training which improves the effectiveness of orientation training. For instance, the application of audio and video teaching is to deliver teaching content through electronic equipment of movies, video files, and recorders. High-tech businesses should emphasize employee orientation training as well as listing fixed percentages of expenses in the budget for purchasing facilities and equipment related to orientation training. By doing so, they can enhance the effectiveness of orientation training. Relevant research and the empirical results of this study discovered that there was more than one training method able to enhance the effectiveness of employee orientation training. Simultaneously using two or more training methods can effectively enhance employees' satisfaction with orientation training (Zumrah et al., 2013; Cao and Hamori, 2016) and their technological ability (Hollenbeck et al., 2006) which promotes the application of their knowledge to work (Aarabi et al., 2013). However, there are certain points to be considered when establishing orientation training facilities and developing the relevant curricula. These include the form and content of orientation training, orientation training skills, selection of lecturers, and richness of hardware equipment.

THEORETICAL CONTRIBUTIONS OF THE STUDY

The research results revealed that organizational performance is created through organizational identification. Employees in high-tech industries who understand the profits shared in the organization can develop organizational identification. Employee orientation training in high-tech industries is worth a lot to employees; they engage more with their work and acquire extra benefits beyond the work in the orientation training. In orientation training, employees in high-tech industries psychologically feel like a member of the company. This feeling improves organizational identification. Orientation training in high-tech industries can boost the employees' organizational identification and self-efficacy promotion. Employees who are highly aware of organizational support can develop positive emotional integration of the organization and devote effort toward organizational profits. In this case, the design of employee orientation training in high-tech industries can be reinforced to promote organizational identification and self-efficacy. When employees perceive the effects of their ideas on decision-making, they would engage more in the work to create maximal profits for the organization. In addition to the findings in this study, the employees' orientation training can also enhance organizational identification, organizational reputation and characteristics (Smidts et al., 2001), organization-offered autonomy (Russo, 1998), organizational support (Wiesenfeld et al., 2001), employees' psychological ownership (Johnson et al., 2006), seniority in the organization (Riketta, 2005), and individual-organization fit (Cable and DeRue, 2002) which can affect organizational identification. For this reason, managers should take them into consideration in practical application to promote organizational identification. According to the results, the following suggestions are proposed: high-tech industries should use education and training satisfaction surveys right after the end of orientation training. Through these surveys, they can understand the trained employees' satisfaction with course materials, lecturers, supplementary materials, and teaching methods. Also, it can help emphasize the competency reinforcement and growth, review the difference between the target and the existing knowledge, and fill in this gap through training and development. Competency is not the same as expertise (knowledge, technique, capability). Another benefit of the study is in establishing an effective internal lecturer training program and system to improve the lecturers in terms of relevant training and teaching methods, and train lecturers' communication skills. With the help of this program, the internal training and teaching quality in high-tech industries can be improved. It is also suggested that high-tech industries can promote competency-based and

development-oriented performance evaluation systems. As a result of this, performance management and development can be recognized as an important reference for human capital development.

Previous research on multimedia audio- and video-integrated education focused on verifying the relationship between learning motivation and learning outcome, while the effects on organizational identification and self-efficacy promotion had not been verified. For this reason, this study brings in new elements to enrich existing theories. Most current studies on the relevant theories focus on school education but rarely on business organizations. Therefore, this study can contribute to the original theories. Moreover, this study, which targets multimedia audio and video integrated education, can verify employees' organizational identification and self-efficacy promotion. The research results confirmed the theoretical statement that the original theories are supported by more empirical results. As for the practical contribution, the results revealed significant positive effects of organizational identification on increasing self-efficacy. It means that multimedia audio/video integrated orientation training can establish and reinforce employees' organizational identification which facilitates employees' self-efficacy. It also proves that the practice of multimedia audio/video integrated orientation training can boost employees' organizational identification and self-efficacy in high-tech industries. In addition, it provides a measurement guideline for high-tech industries by reinforcing the employees' organizational identification and self-efficacy enhancement.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The present study was conducted in accordance with the recommendations of the ethics committee of the Da-Yah University, with written informed consent being obtained from all the participants. All the participants were asked to read and approved the ethical consent form before participating in the present study. The participants were also asked to follow the guidelines in the form in the research. The research protocol was approved by the ethical committee of the Da-Yah University.

AUTHOR CONTRIBUTIONS

L-CH performed the initial analyses and wrote the manuscript. C-YH assisted in the data collection and data analysis. Both authors revised and approved the submitted version of the manuscript.

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BRIEF RESEARCH REPORT
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Based on Role Expectation to Discuss Role Ambiguity and Practice of University Teachers in Business Administration

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As a result of social change, the issues, such as the complexity of family structure and increasing student problems, are becoming more complicated. Both schools and parents have high expectations of teachers and expect them to solve the problems. Considering the many different factors involved in this issue, this could lead to a psychological and physiological imbalance in teachers, especially in relation to their emotions which results in role ambiguity. The participants of this study consisted of teachers in business administration departments of universities in China. During the data collection, 450 copies of the questionnaire were distributed. A total of 363 valid copies were retrieved, with a retrieval rate of 81%. It can be concluded that the results of this study can help national university faculty present professional spirit and attitude toward the professional service, which in turn promotes the standard of national education in universities.

Keywords: university teachers in business administration, role ambiguity, role expectation, role practice, legitimacy

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INTRODUCTION

Education has improved greatly in recent years. Likewise, parents are gradually placing more emphasis on the importance of their children's education, especially on the quality of teaching. Under the impact of the low birth rate, many parents are concerned about education. At the same time, concerns about teacher competence are worth discussing. Regardless of the high investment in education, access to good software–hardware in schools, and higher quality students, these components are meaningless without a "good teacher." Teachers play an important role in the effectiveness of education. In recent years, many serious crimes have caused the society to worry about the shortage of manpower and insufficient expertise or skills on campus. Since school work is done by general teachers, counseling work cannot be done effectively. Prior to the outbreak of the incidents, education staffs are unaware of the importance of counseling and ignore the hidden signs of the crisis on campus, for example, bullying, gender equity, and high-risk students. Student-related problems can be ignored and may not be seen as a problem for the future. In addition, many people in the society do not have a proper understanding of school work, have false expectations of teachers' work, and falsely attribute student responsibility to teachers, believing

that teachers can and should do everything. Such a strong role pressure causes deep frustration and helplessness among teachers, who gradually lose their passion for the work. The reasons behind this are the teachers playing complicated and multiple roles. They are responsible for guiding students with deviant behaviors, consulting with teachers or parents, and helping with work-related issues in schools.

This leads to excessive pressure and burnout among teachers and even makes them consider changing jobs. Teachers start to procrastinate and get tired. They not only have to think about problems, but also control their emotions. They also need to improve themselves and find a way to take care of themselves after work. Modern national education reform is about promoting the performance and quality of national education. National education reform is a recent trend, but its effectiveness depends on the front-line executors, that is, the cooperation of teachers. Without a "good" teacher, the large investment in education, the good software–hardware of schools, and the high quality of students would be "in vain." It is as in the saying "excellent teachers build a nation," which applies to the past and also to the present and to education at the national level and abroad. Education, as a fundamental task that is crucial for generations, influences the future development and competitiveness of a nation. Teachers in the new age should present Pädagogishe Liebe (pedagogical love), professional competence, and capacity for the future. They should also stick to student-centeredness in classrooms, diligently and orderly develop the imperceptible and mind-changing educational function, and bear the burden of educational effectiveness. It can be seen that teachers' classroom practices emphasize the promotion of educational performance and quality. Obviously, the effectiveness of teachers' role practices is the key to the success of education reform; the importance of teachers' role practices in educational effectiveness is obvious. From the perspective of school education, teacher's performance can directly affect the effectiveness of the school. In other words, teacher's performance directly affects the achievement of schools' educational goals and is indirectly related to the students' attitudes and expectations for learning performance.

The profession of teaching requires a high level of expertise, so educators should be treated as professionals and teachers' specialization should be confirmed to promote the teachers' professional development. The increased level of knowledge in recent years has made parents more concerned about their children's learning equity. This may lead to the differences between parents and teachers on the essence of teaching, learning, and evaluation, but the conflict is often heard. In this case, curriculum, instruction, and performance contents are often affected by the parents, which prevents teachers from teaching with professional knowledge–competence and developing professional autonomy. In addition, due to the social change, the issues, such as the complexity of family structure and the increasing student problems, are becoming more complicated. Accordingly, schools sometimes have to take over the function of the family. Teachers are on the front-line people and experience bridging families and schools most of the time.

The surprise attack of COVID-19 has led to a radical change in the world order. The countermeasures are proclaimed in the framework of the state of emergency. School education with the face-to-face teaching environment bears the brunt of campus closure and cease of teaching and learning activities. However, many schools have switched to distance education in order not to interrupt learning (Kamali, 2021). Distance education practiced due to COVID-19 can be called "emergent distance teaching," because teachers and students were in a hurry to implement and adapt to the changes within a short period of time. Many schools were not prepared well, and teachers were not familiar with distance education technologies and teaching methods. The process of improving distance education and increasing learning effectiveness is challenging (Marinoni et al., 2020). Teachers must adapt teaching models that are completely different from those of the past. These new teaching models were complicated and integrated with various advanced technologies. Since teachers did not experience such a situation before, nor had the necessary training, some teachers seemed to suffer from teaching frustration and psychological stress (Sadeghi, 2019).

Both the schools and parents have high expectations of teachers and expect them to solve the problems. Considering the many different factors involved in this issue, this could lead to a psychological and physiological imbalance in teachers, especially in relation to their emotions which results in role ambiguity. The review of the literature on teacher role and work revealed that there exist many studies that address role ambiguity, role expectation, job satisfaction, and job pressure (Lin and Ling, 2018; Amiruddin, 2019; Antwi et al., 2019; Wang et al., 2020). However, it was found that research on role ambiguity, role expectation, and practice is scarce, and research findings are mixed. The existing research on role ambiguity and role expectation mainly focused on the health-care workers, social workers, associate counselors, and human resource professionals (Mañas et al., 2018; Kokoroko and Sanda, 2019; Maden-Eyiusta, 2019), but the studies rarely focused on the university faculty. The research on professionals and married career women revealed significant correlations between role ambiguity and role expectancy with reverse predictability. Nonetheless, the relationship between role ambiguity and role expectancy of university educators has not yet been examined. However, many scholars (Bergström, 2019; Goldhaber et al., 2019; Kempe and Grönlund, 2019) indicated that teachers play a crucial role in curriculum implementation and development, and therefore, they need to be aware of their identity in it. As described in the research background of this study, teachers' professional roles change over time, and that is why different interpretations follow one another. Regarding teachers' role in curriculum development, many scholars (Hershkovitz and Karni, 2018; Prince, 2018; Doron and Spektor-Levy, 2019) believed that it should be limited to a passive position, such as approving and implementing courses. Given these views, we should focus on the professional role of teachers. Better learning outcomes are usually the result of a better practice of professional roles. When developing a curriculum, the extent to which teachers practice their roles is critical to implementation results. The importance of teachers' role practice can also be understood in

this context. Therefore, this study investigates the role ambiguity, role expectation, and practice of university faulty in business administration departments. It is expected that the results of the study will help national university faculty to show professional spirits and attitudes in their professional activities, which will greatly contribute to the promotion of educational standards in national universities.

LITERATURE REVIEW AND HYPOTHESES

Zahwa et al. (2020) conducted a qualitative questionnaire survey to investigate the practices and affective state of the university faculty in the field of science and technology and found that most university faculties were familiar with course content and instructional design. However, they did not understand the use of the technology and considered instructional videos to be an important tool better suited for distance education. Espino-Díaz et al. (2020) noted that distance education was practiced to cope with COVID-19; yet, even teachers and students in advanced countries experienced a lack of the necessary equipment for distance education or fast bandwidth. The questionnaire survey of students revealed that a high proportion of problems were caused by the Internet speed and equipment in residential areas. Departmental responses and faculty interviews also indicated that faculty had the anxiety of mastering distance education technologies at the beginning of distance education (Yen et al., 2018). To cope with distance education practiced due to COVID-19, different pedagogical methods should be adapted in the process. Nevertheless, it was a challenge for teachers who were forced to suddenly switch from face-to-face to distance education. Although most teachers felt that they performed well in distance education, 16.7% of the students stated that teachers needed to improve themselves in terms of the distance education pedagogy (Kamali, 2021). Teachers might consider the ability to use synchronous video tools or recorded lessons as a satisfactory way of distance education; in reality, this is far from high-quality distance education. Moreover, students' learning effectiveness needs to be better tested as well (Yen et al., 2018).

Maden-Eyiusta (2019) explained role ambiguity as the lack of clear information about role expectation, how to fulfill role expectation and role performance. Clemen et al. (2018) indicated that several researchers mentioned indefinite or insufficient information about the individual role when defining role ambiguity. In this situation, people could not clearly define the work goals and responsibilities, which results in negative effects and pressure and causes ambiguous role expectations. Yester (2019) explained role expectation as the individual or group expectation of a certain role, which includes an individual expectation of a certain role and the groups' or others' expectation of the role. If an individual perceives the role differently than the needs or expectations of others due to role ambiguity, this results in role expectation differences. Hughes and Evans (2018) considered role expectation as the expectation and requirement of role takers and role givers. If a role taker exhibits role ambiguity that causes a difference in the role giver's role expectation. This will lead to role expectation differences. Accordingly, this study hypothesizes that **H1:** role ambiguity presents negative and significant effects on role expectation.

In a study of military instructors, Smith and Sweet (2019) found out the significant effects of role behavior and role practice. In this study, the role behavior model showed role congruence with others' expectations and self-expectation. Martínez-Díaz et al. (2020) pointed out that role expectation is the public expectation of the behavior of a person with a specific social status. This also includes self-expectation and public expectation of the role. Al-Nasser and Al-Enezy (2018) concluded in their study that military instructors' role behavior and role practice influence each other. Military instructors who were reinforced in their role behavior performance improved their job performance. When role behaviors are consistent with others' and their own expectations, they receive positive evaluations and demonstrate better role practice. In a study of higher education professionals, Kanellakis et al. (2018) found that the factors of role practice included role expectation, workload, and professional knowledge or competence. In this study, role expectation was found to have positive correlations with role practice. Accordingly, higher education professionals with high personal role expectations showed better role practice. Accordingly, this study hypothesized that **H2**: role expectation has positive and significant effects on role practice.

Yan et al. (2021) considered role practice as a person's actual performance during role tasks or behaviors. Zhang and Sun (2020) referred role practice as the actual behavior of a role performed in the society related to the role. Zambrana et al. (2019) study revealed significant negative correlations between role ambiguity and role practice, and they concluded their study by suggesting that a bank that emphasizes role conflict and role ambiguity of financial advisors may contribute to the job satisfaction of financial advisors, which in turn improves their role practice. Bloomingdale and Darmody (2019) discovered that there were more senior financial advisors than junior financial advisors among the study participants and suggested providing employees with clearer direction and work objectives to better understand the expectations of the bank and individual responsibilities to reduce role ambiguity and promote role practice. It was necessary to reduce role ambiguity and increase self-efficacy to promote role practice among managers. Mitchell et al. (2018) mentioned in their study that directors with uncertain and ambiguous work contents may not be aware of job objectives, scope, program, and responsibilities and tasks. They concluded in their study that research participants' role ambiguity was caused by the unfamiliarity with company regulations and objectives. Therefore, the participants of the study were suggested to fully understand corporate regulations, operational objectives, and applicable resources and programs. Consequently, this study hypothesizes that **H3**: role ambiguity has significant negative effects on role practice.

Based on the above literature, it is considered in this study that there is a relationship among role ambiguity, role expectation, and role practice. The influence paths and the hypothesis tests conducted in this study are illustrated in **Figure 1**.

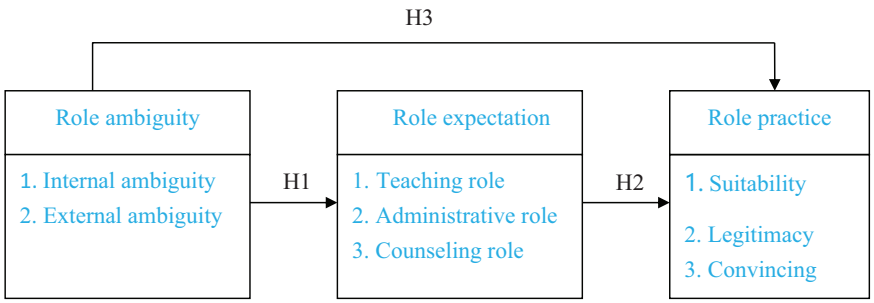

FIGURE 1 | Conceptual structure.

METHODOLOGY

Operational Definition

Role Ambiguity

With reference to Lin and Ling (2018), the role ambiguity in this study can be defined with two dimensions.

1. Internal ambiguity: the absence of information about role definition, expectations, job title, behavior, and ethics when interacting with the internal organization.
2. External ambiguity: the absence of information about role definition, expectations, responsibilities, tasks, behaviors, and ethics when interacting with external members of the organization.

Role Expectation

Following Shin and Gonzalez (2018), teachers' role expectation was defined with three dimensions in this study.

1. Teaching role includes instructional objectives, curriculum design, teaching skills, environment design, instructional resources, and instructional assessment.
2. Administrative role covers administrative work and interaction with parents and other people, as well as teachers' self-improvement.
3. Counseling role includes respecting, understanding, and guiding students, as well as conducting a healthy teacher–student interaction.

Role Practice

Based on Shea et al. (2019) study, three key dimensions were considered for the success of role practice.

1. Suitability: the suitability of the behavior performed for the position, conformity to situations, and the correctness of the practice behavior.
2. Legitimacy: whether the performed behavior conforms to regulations and is good behavior.
3. Convincing: whether the performed behavior convinces others and the practice is sincere.

Research Method

A questionnaire survey refers to a standard questionnaire designed by the researcher for the respondent. Questionnaires are used to collect current facts, improve current standards, draft the topic of the plan, decide measures, and provide research references (Eden and Ackermann, 2018). Schwab-McCoy (2019) pointed out the following advantages of a questionnaire survey. (1) The copy and the postage costs for the questionnaire are low and it is easy to implement. (2) Respondents can answer freely without the psychological burden of interacting directly with the researcher. (3) The content of the items is consistent, so that they can be easily compared and standardized. In a questionnaire survey, the researcher can prepare a questionnaire with the studied items and send it to the respondents to collect the data. Respondents are selected in representative samples for the study to determine the mutual effects, distribution, and reciprocal relationships among variables (Kwiek, 2020). Considering the research objectives, research problems, and the appropriateness of different research methods, a questionnaire form was used in the survey research of this study.

Questionnaire Design

The questionnaire was designed based on the relevant literature. The draft questionnaire was formed after in-depth interviews with the experts. After the pretest, the preliminary questionnaire's reliability was calculated for the formal questionnaire. In the development process of the preliminary questionnaire, expert interviews were conducted on the validity of the questionnaire, and expert opinions were received for the content validity of the questionnaire. The expert review refers to the in-depth interviews with six scholars and six senior teachers to receive their opinions for the questionnaire items. The preliminary questionnaire was revised according to the experts' opinions. Faculty members from six universities were invited to fill in the preliminary questionnaire. Then, 1 week after sending the questionnaire, the responses of the ones who did not return the questionnaire were collected with phone calls to increase the response rate. It was aimed to retrieve 50 copies of questionnaires for the analysis.

Participants of the Study

The participants of this study were composed of faculty members in business administration departments of universities in China. In the process of data collection, 450 copies of questionnaires were distributed. A total of 363 valid copies were retrieved, with a retrieval rate of 81%.

Reliability and Validity Tests

Confirmatory factor analysis (CFA) is an important component of SEM. For this reason, the measurement model should be tested with a two-stage model modification during CFA before the structural model evaluation. When the model fit is acceptable, a second-step SEM is conducted. The factor loadings of the dimensions in the model were found as between 0.60 and 0.80. The composite reliability was found between 0.75 and 0.90, and the average variance extracted was between 0.60 and 0.80. These results meet the standards of (1) factor loading > 0.5, (2) composite reliability > 0.6, and (3) average variance extracted > 0.5. Thus, the dimensions show convergent validity.

RESULTS

Structural Model Analysis

The structural model analysis includes the analysis of model fit and explanatory power of the overall research model. According to the researchers' opinions, seven numerical indices were used for testing the overall model fit. These tests included the chi-square ($\chi 2$) test, the $\chi 2$-degree of freedom ratio, the goodness-of-fit index, the adjusted goodness-of-fit index, the comparative fit index, the comparative hypothesis model, and the chi-square difference of independent model.

To sum up, the $\chi 2$-degree of freedom ratio is used to test model fit and it is better when smaller. The $\chi 2$-degree of freedom ratio of this research model was found as <3 (1.36). GFI and AGFI are better when they are close to 1, without an absolute standard for the fit. Accordingly, GFI > 0.9 and AGFI > 0.8 can be considered as acceptable. GFI and AGFI in this study were found as 0.95 and 0.86, respectively. RMSEA between 0.05 and 0.08 reveals a good model with a reasonable fit; RMSEA in this study was calculated as 0.07. The acceptable standard of CFI is >0.9; CFI in this study was revealed as 0.92. NFI should be higher than 0.9; NFI in this study was found as 0.90. Overall speaking, the goodness-of-fit indices conform to the standards, which reveals an acceptable model of the research results. Therefore, the research patterns can be used to explain the formal research data.

From the above overall model fit indices, it can be seen that the model structured in this study and the observed data have favorable goodness of fit, which means that the theoretical model can fully explain the observed data. After testing the model fit, the correlation coefficients and coefficient estimates between role ambiguity, role expectation, and role practice can be better understood.

The research data were organized in **Table 1**. The overall results of the model analysis showed that two factors in role ambiguity (internal ambiguity and external ambiguity) can significantly explain role ambiguity ($t > 1.96$, $p < 0.05$). Similarly, three factors in role expectation (teaching role, administrative role, and counseling role) can significantly explain role expectation ($t > 1.96$, $p < 0.05$). Finally, three factors in role practice (suitability, legitimacy, and convincing) can significantly explain role practice ($t > 1.96$, $p < 0.05$). Obviously, the overall model presents a good preliminary fit.

TABLE 1 | Overall results of linear structural model analysis.

Evaluation item	Parameter/evaluation standard		Result
Preliminary fit	Role ambiguity	Internal ambiguity	0.65*
		External ambiguity	0.67*
	Role expectation	Teaching role	0.74**
		Administrative role	0.73**
		Counseling role	0.71*
	Role practice	Suitability	0.66*
		Legitimacy	0.75**
		Convincing	0.77**
Internal fit	Role ambiguity→role expectation		−0.83***
	Role expectation→role practice		0.85***
	Role ambiguity→role practice		−0.88***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

In terms of the internal fit, the role ambiguity showed negative and significant correlations with role expectation (−0.83, $p < 0.01$), role expectation revealed positive and significant correlations with role practice (0.85, $p < 0.01$), and role ambiguity was found to be negative and revealed statistically significant correlations with role practice (−0.88, $p < 0.01$). According to the results, H1, H2, and H3 were supported.

DISCUSSION

The work content of university faculty in business administration has changed with the needs in different places. So, school supervisors can have different requirements for teachers. In addition, school supervisors do not have sufficient knowledge about university faculty in business administration. As a result, high expectations are placed on university faculty in business administration and they are even assigned other administrative tasks, which leads to an additional burden and even disrupts the rhythm of teaching. This situation results in role ambiguity on university faculty in Business Administration. As a result, they have to constantly communicate with their supervisors about the difference between their own expectations and the supervisors' expectations, which leads to delays in teaching. To cope with the global rage of the COVID-19 pandemic, many schools have implemented "distance learning" to avoid interrupting students' schoolwork (Chew et al., 2020). COVID-19 pandemic has changed the world, people's lives, and their learning styles, which accelerates the development of distance education (Garfin et al., 2020). Faced with unfamiliar teaching styles, teachers show anxiety and confusion (Kamali, 2021). In such a chaotic period, the application of distance education to students causes teachers to experience difficulties in evaluating each student's learning situations (Lupe et al., 2020), and the difficulty of maintaining order in the classroom increases to increase teachers' role pressure in teaching activities (Lai et al., 2020). It is suggested that school supervisors clarify and improve the knowledge of university faculty in business administration. They should also help the teachers to understand the work content and limits through mutual communication and encouragement, support the teaching work, and have university faculty in business

administration focus on teaching activities to enhance the role practice at work. University faculty in business administration, on the other hand, need to increase their professional knowledge to enhance their professional status and be interested in and capable of conducting research on education. Professional development is a continuous process. To adapt to the social changes and the development of the world trend, the continuous professional development of university faculty in business administration is an important way to improve their professional knowledge. Accordingly, university faculty in business administration who conduct more studies on education and publish more research results and experiences on journals to manage the professional image can help the public recognize their professional image.

CONCLUSION

The research results revealed that the regulations for the work content of university faculty in business administration and various systems are not fully planned. Therefore, university faculty in business administration feel the need to clarify various regulations, responsibilities, work content, and work objectives to improve their devotion to work and achieve a higher level of ability. University faculty in business administration who are willing to engage in teaching activities are ambitious, have high expectations of themselves and their work, and strive to support students in the learning process. University faculty in business administration has a high expectation of the provision of student and parent counseling, evaluation of problems, promotion of teaching, and the integration of surrounding resources. With high role expectations, the role practice to display the ability to work and the promotion of teaching can be satisfactory. The research results revealed that university faculty in business administration have high role expectations during low role ambiguity which facilitates role practices. In view of the ever-changing educational environment, university faculty in business management need to constantly pursue new knowledge, improve teaching, enrich the content, participate in study- or education-related workshops, and enhance their teaching and counseling abilities to reduce role ambiguity and achieve role expectation and role practice (Ho et al., 2021). The administration unit should organize workshops according to the teachers who need to reduce the fear of negative reactions (Tabancali and Su, 2021). Teachers should be encouraged to explore new topics and new ways of thinking and apply the acquired knowledge in the classroom to promote students' learning ability and gain parents' trust. Complementarity among different stakeholders can reduce role ambiguity (Lin and Chuang, 2018).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

This study was conducted in accordance with the recommendations of the Ethics Committee of the Fujian Business University, and written informed consent was obtained from all the participants. All participants were asked to read and approved the ethical consent form before participating in this study. The participants were also asked to adhere to the guidelines in the form during the implementation. The research protocol was approved by the Ethical Committee of the Fujian Business University.

AUTHOR CONTRIBUTIONS

YD performed the initial analyses and wrote the manuscript. HZ, AX, and YC assisted in the data collection and data analysis. All authors revised and approved the submitted version of the manuscript.

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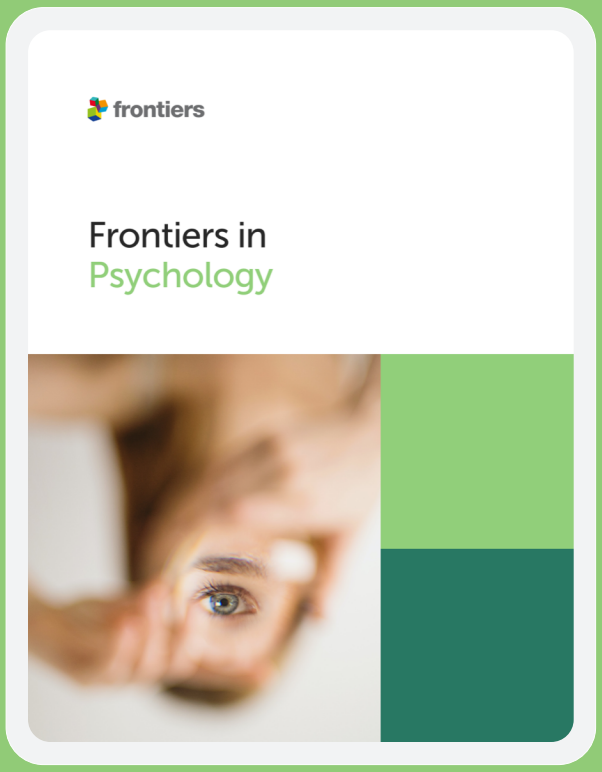

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