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Social Media Technologies Used for Education: An Empirical Study on TAM Model During the COVID-19 Pandemic

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The study's major goal was to figure out what factors impact university students' behavior and intentions to use social media to boost their academic performance during the COVID-19 Pandemic. Given the context-dependent nature of online learning, the Technology Acceptance Model (TAM) was adopted and supplemented with components largely relevant to harnessing social media for collaborative learning and engagement. Collaborative learning, student participation, and a social media mindset are just a few of the new features. The enlarged model was validated using empirical data from an online survey questionnaire filled by a sample of 409 Saudi Arabia higher education students, which assesses students' social media usage intentions and academic performance during the COVID-19 Pandemic. AMOS-SEM was used to analyze the model's various assumptions (Analysis of Moment Structures- Structural Equation Modeling). The findings revealed that: (1) utilizing social media for collaborative learning and student engagement has a direct positive impact on perceived usefulness, ease of use, and enjoyment; (2) perceived usefulness, ease of use, and enjoyment has a direct positive impact on attitude to use social media; and (3) the link between TAM characteristics "usefulness, ease of use, and pleasure" and behavior intention to use social media is mediated by attitude to use social media. (4) Students' attitudes and behavior intentions on social media have a direct positive influence on their academic performance during the COVID-19 Pandemic. Academics, higher education institutions, and educational technology application providers will benefit greatly from the conclusions of this study, both theoretically and practically.

Keywords: social media technologies, AMOS-SEM, TAM model, COVID-19 pandemic, academic performance

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INTRODUCTION

Previous research on the use of social media in higher education (Awidi et al., 2019; Manca, 2020) has shown that it may be utilized to increase student collaboration and engagement, as well as augment conventional learning and enhance academic success (Awidi et al., 2019; Manca, 2020). This study, on the other hand, aims to look at the use of social media for maintaining formal academic performance during the COVID-19 Pandemic in public institutions that do not have a strong social media presence and were relied on in-class communication before to COVID-19, particularly after the global pandemic. COVID-19 has had a major negative impact on many

facets of education, and has been especially detrimental to those students with the least resources. Institutions with little technological adaptability have also suffered from the changes caused by the pandemic (Faura-Martínez et al., 2021; Talib et al., 2021; Tang et al., 2021). Following their academic success as measured by the TAM model, students' academic performance during the COVID-19 Pandemic entails using social media as the exclusive and official platform for academic-related purposes such as teaching and learning, student support, community building, and participation. The social media phenomenon has had an impact on Saudi Arabia, as it has on many other countries. According to data, education is one of the top five countries in terms of the number of social media profiles created (Alamri et al., 2020; Ali Qalati et al., 2021). Among research students, social media is frequently seen as enhancing active collaborative learning. In higher education, however, there is a scarcity of study on this subject. As a result, the current study attempted to fill a vacuum in the literature by analyzing how the usage of social media for active collaborative learning and engagement affects research students' academic performance during the COVID-19 Pandemic. The technology acceptance model and constructivism theory were used to create the research model (TAM). This study examined the interactive and perceptual aspects of social media use using constructivism theory and the technology acceptance paradigm (TAM). Active collaborative learning, according to Shen et al. (2021), is a continuous process in which students communicate and exchange ideas and opinions *via* social media (Phuthong, 2021). These modes of communication also include social media technologies such as e-mail, intranets, blogs, video conferencing, photograph sharing, wikis, and virtual mobile phone enterprises (Anser et al., 2020). Communication, in its broadest sense, is a system that enables people to connect, cooperate, and communicate with one another in a group setting *via* active collaborative learning and engagement with material, opinions, encounters, experiences, and technologies (Rahman et al., 2020). Due to the ease of use and utility of social media, students may become more active, increase understanding and conversation among classmates, supervisors, professors, and experts, seek professional support, and solve problems (Ghani et al., 2019). The reported ease of use and usefulness were statistically significant satisfaction indicators. People who have more friends and engage with more pupils are happier, according to research, than those who have fewer friends and contact with fewer students (Mostafa, 2020). Despite this, educators who use social media have expressed concerns about its difficulties, as well as insufficient evaluation and assessment (Moran et al., 2019). Students on campus require more support in accessing extra social media active collaborative learning choices than they do in face-to-face sessions, according to an empirical research. When it comes to using social media for active collaborative learning and engagement, lecturers may play a vital role in supporting students with speedy questions, solutions, and coordination (Hamadi et al., 2021). Evaluative times were created to allow teachers and students to provide feedback (Khan et al., 2021). Use of social media has an impact on study habits and can be a study distraction (Van Den Beemt et al., 2020). Individual learning capacity and accountability for vast amounts of communal information should also be fostered and monitored, despite the fact that the present educational focus has shifted substantially from individual learning to active collaborative learning (Liang et al., 2021). Students must also become more self-directed in their usage of technology as it becomes increasingly integrated into school (Sakurai et al., 2021). Students who were unfamiliar with the technology, as well as those who had had negative experiences with it, expressed interest in using social media for active collaborative learning and engagement, but stated that they would prefer to use media for interaction (Dzogbenuku et al., 2021). In the United States sample, multitasking and time wasting were also shown to attenuate the unfavorable connection between social media use and GPA. It's conceivable that this is related to European pupils' lower proclivity for multitasking (Rasheed et al., 2020). Active collaborative learning, on the other hand, will be successfully managed (Bouton et al., 2021). University students who use Facebook spend less time studying and get poorer marks than those who do not, according to Ohio State College data (Abbasi et al., 2021). As a result, students' overall academic performance during the COVID-19 Pandemic suffers as a result (Masood et al., 2020). Cañabate et al. (2021) discovered that students' comprehension of networking technology is passive rather than active (Cañabate et al., 2021). While there have been many social media studies aimed at elucidating influential factors on the use of social media networks, there have been few comprehensive studies on social media networks that have combined all essential factors of social media network use for active collaborative learning and engagement in a single study (Pitafi et al., 2020). As a result, social media research in higher education will be able to include all factors related to social media, which is seen as a critical step in understanding students' use of social media for active collaborative learning and engagement, as well as the impact it has on their academic performance during the COVID-19 Pandemic. As a result, the primary goal of this research is to overcome the flaws that will be developed in a model that demonstrates perceptual, social media use to active collaborative learning, engagement, and satisfaction of research students in higher education using the Technology Acceptance Model TAM model (Davis, 1989) to evaluate academic performance during the COVID-19 Pandemic. Furthermore, while many social media models exist for measuring research students' academic performance during the COVID-19 Pandemic and satisfaction *via* social media for active collaborative learning and participation in higher education, none exist for measuring research students' academic performance during the COVID-19 Pandemic and satisfaction *via* social media for active collaborative learning and participation in higher education, indicating a gap in the field. As a result, using the TAM model, the study's research subject will be to analyze and examine the aspects that define the relationships between active collaborative learning and engagement in order to affect research students' academic success. According to the researcher's major study question, what are the perceptual features that influence active collaborative learning and engagement, and hence academic success? Thus, the goal of this study is to create a model of social media

use for active collaborative learning and engagement based on perceptual factors that influence academic performance during the COVID-19 Pandemic in higher education institutions, as well as to validate the Technology Acceptance Model (TAM) for interactivity and social media use for active collaborative learning and engagement on research students' academic performance during the COVID-19 Pandemic in higher education institutions.

Social Media Use in Higher Education

In terms of skills, higher education has recently moved its emphasis from knowledge to lifelong learning (Greenhow et al., 2020). Cooperation skills are highly valued by employers, hence they are included in this list (Raza et al., 2020). The most broad definition of active collaborative learning was offered by Bui et al. (2021), who defined it as a scenario in which two or more individuals study or seek to learn something new together. Given the broad definition of the term "social media," the bulk of research looked at specific social media platforms like MySpace, Facebook, and Twitter as educational successes, which seems sensible. The objective and functions of social media sites are to make it easier for users to exchange emails, add friends, construct personal profiles, join groups, develop apps, and locate other users (Stockdale and Coyne, 2020). Web 2.0, as opposed to its predecessor, web 1.0, which was more static and less dynamic, allows for increased user engagement, collaboration, and customization (Tajvidi and Karami, 2021). They include active collaborative learning *via* Facebook, blogs, and YouTube, among other things, as noted in Shahbaznezhad et al. (2021).

PERCEPTUAL VARIABLES USED WITH THEORIES

Davis et al. (1989) introduced the Technology Acceptance Model (TAM), which will be used in this investigation. This model looks at the elements that determine how people utilize social media when they try out a new product or service (Davis et al., 1989). According to several research, perceived simplicity of use and utility have a substantial influence on satisfaction and willingness to utilize new technology (Rahmi and Birgören, 2020). The Technology Acceptance Model (TAM) is also used in this study, which says that perceived usefulness and ease of use are the most important criteria in determining whether or not a new technology is adopted. The most widely used theoretical model in this subject is TAM, which was established by Davis et al. (1989) to explain why people embrace or reject computer innovations like social media. Prior research provides the foundation for building and creating a research model to examine the influence of social media use in collaborative learning on research students' learning outcomes. Constructivism theory and the technology acceptance model were used to design the research model (TAM). Based on the findings, eight operational themes of key factors on social media use for active collaborative learning and engagement that impact academic performance during the COVID-19 Pandemic were identified and classified (see **Figure 1**).

Using Social Media for Collaborative Learning

Individuals work together to attain their shared learning goals through cooperative learning, which takes occur in groups (Khan and Mansoor, 2020). Positive interdependence, individual accountability, promotive interaction, interpersonal and small group abilities, and group processing are the five core aspects of collaborative learning (Lee and Yang, 2020). Positive interdependence, which "exists when group members think that they are linked in such a way that no one can achieve unless everyone succeeds," is the most important aspect. "Everyone fails if one person fails" (Khan and Mansoor, 2020). Group processing is the last component, which entails group members analyzing their work in accordance to their objectives and maintaining positive working relationships (Khan and Mansoor, 2020). To guarantee that all five key aspects are in place, teachers must dedicate substantial planning time to cooperative learning (Junco et al., 2013; Al-Rahmi and Zeki, 2017; Al-Rahmi et al., 2019a). Cooperative learning groups, according to Khan and Mansoor (2020), are generally 2–4 students in size, with smaller groups being recommended. There is no ideal group size for cooperative learning. The number of students in a group is decided by a variety of factors, including the length of time the group will be working together, the ages and previous group work experience of the students, as well as the resources and equipment available (Chatterjee and Correia, 2020).

Student Engagement

The theory of student engagement arose from a proportionate educational approach to increase student involvement. Today, engagement is defined as the amount of energy a student devotes to educational activities that are scientifically linked to better college outcomes (Bond et al., 2020). Academic interactions with professors, participation in class activities, and interaction with classmates in the quest are all forms of engagement (Meintjes and van Wyk, 2020). Because this type of online tool has been proved to boost student academic success and experience by fostering cognitive engagement and social connection, the social media network was chosen (Aljuboori et al., 2020).

Perceived Usefulness

Perceived usefulness is the most crucial measure of IT use among users, according to the TAM model (Davis, 1989). On the other hand (Acharya and Ganesan, 2019), discovered that the utility of information systems (IS) had a negative influence on attitudes about their utilization. According to previous study, PU has the largest influence on attitude (Martinho et al., 2018). Furthermore, PU had a significant impact on future intentions to utilize social media (Abdullah et al., 2016; Scherer et al., 2019). According to Al-Rahmi et al. (2018a) perceived utility (PU) in the context of social media is defined as the degree to which users believe that social media may assist them achieve teaching and learning objectives.

Perceived Ease of Use

In the context of social media, Al-Rahmi et al. (2018a) defined perceived ease of use (PEU) as the degree to which consumers

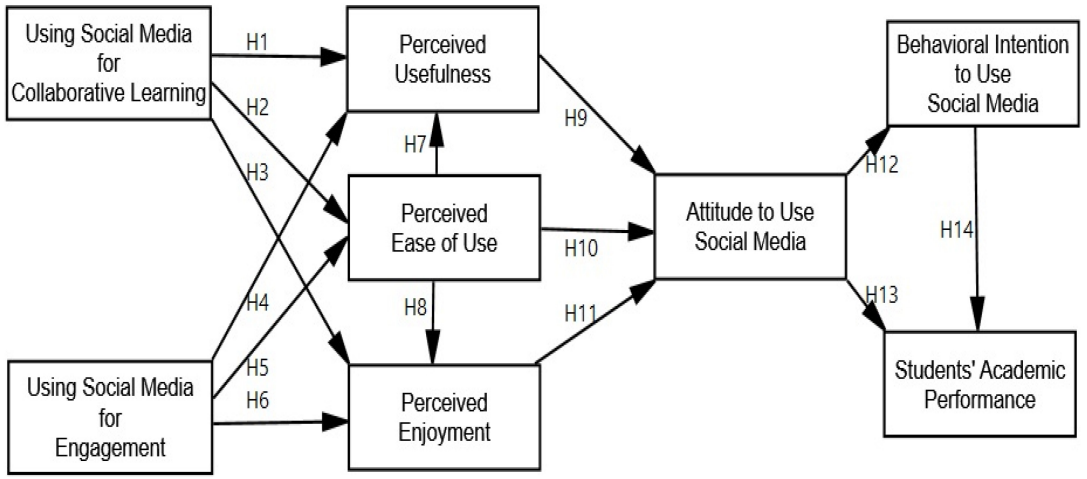

FIGURE 1 | Research model.

believe that utilizing social media is straightforward. According to past research, PEU has a significant influence on perceived usefulness (Abdullah et al., 2016; Binyamin et al., 2019). In addition, past research has found that PEU is a significant predictor of attitudes toward social media use (Fokides, 2017; Al-Rahmi et al., 2021a). PEU influences perceived usefulness, behavioral attitude, intention, and actual usage, according to TAM (Davis, 1989). The regression results, according to Davis (1989), indicate that, from a causative standpoint, PEU may come before perceived usefulness, rather than being a parallel and direct driver of utilization (Venkatesh and Davis, 2000).

Perceived Enjoyment

Perceived joy has an impact on the rising popularity of social media as a motivator (Rauniar et al., 2014; Al-Rahmi and Zeki, 2017). "The degree to which the act of utilizing technology is designed to be pleasurable in and of itself, independent of any potential performance concerns," according to the definition (Davis et al., 1992). Users on social media are more interested in a service if they can experience it in a more immersive environment (Rauniar et al., 2014). People who love using a web system have a positive perspective of their interactions with it, according to Moon and Kim (2001), and are thus more inclined to utilize it to increase their collaborative learning (Sa'nch et al., 2014). However, when compared to other external factors, perceived enjoyment as an external factor in the context of student learning has not been frequently detected in previous TAM investigations.

Attitude to Use Social Media

Triandis (1971) defines attitude as a representation of sentiments and understanding about a topic or situation, as well as an individual's positive or negative behavior. Attitude includes three components, according to Mantle-Bromley (1995), which are concerned with people's preferences, knowledge of the attitudinal object, and reactions and intents toward the object, respectively. Previous study on the acceptability of social media has discovered that attitude is a key factor in determining whether or not to utilize it (e.g., Al-Rahmi et al., 2018b, 2021b). Attitude is discovered to be a significant influencer on behavioral intention (Al-Rahmi et al., 2018b; Rasheed et al., 2020). As a result, the researchers observed that students' opinions had an impact on their desire to use online learning technologies. Furthermore, according to a study done by Sujeet and Jyoti (2013), attitude and PEU may influence enhanced behavioral intention among Omani students. Rupak et al. (2014) discovered that TAM has a substantial positive association between perceived usefulness and PEU, and that both categories had a favorable influence on behavioral intention in their research of social media usage behavior.

Behavior Intention to Use Social Media

Many earlier research on technology adoption have highlighted attitude as an important determinant of online earning and social media learning (Tosuntaş et al., 2015). Users that have a good mindset are more likely to use social media, according to Cheung and Vogel (2013). Given the rapid rise of online learning, Wang and Wang (2009) claim that the desire to utilize it differs greatly from actual use. To have a better knowledge of how different social media platforms are used. Al-Rahmi et al. (2020a) argue that there is a chance that the intention and behavior are conflicting, since the intention to embrace social media might be impacted by unanticipated occurrences. As a result, Dlalisa and van Niekerk (2015) performed an assessment of users' intentions and discovered that there is no substantial link between their intention and their actual usage of learning management systems and social media platforms. TAM is an extension of the TRA established by Davis (1986), and it gives a theoretical foundation for analyzing how external variables affect interior beliefs, attitudes, and actual usage, which determines their pleasure and use of technology. It also serves as a framework for explaining user behavior when it comes to adopting new technology and investigating the factors that impact attitudes toward such technology use (Davis, 1989). The purpose of this study is to analyze students' and instructors' satisfaction with the use of social media for active collaborative learning and

participation, as well as its impact on academic advancement in higher education institutions, using a TAM-based questionnaire.

Academic Performance During the COVID-19 Pandemic

Active participation in collaborative learning is encouraged by social media. To say that social scientists' attention is drawn to social media by the increased interest in active collaborative learning is an understatement (Abdillah et al., 2020). Clapp et al. (2021) used a social bookmarking application to increase active collaborative learning by using the method and virtual framework built for the benefit of student motivation and collaborative group learning among peers, teachers, and owners in another study (SSCL). Knowledge and experience transfer are seen as complements to precise knowledge development that is relevant to real-world circumstances (Sohaei et al., 2020). The primary advantages of using social media to aid learning and teaching will not be fully appreciated until more research is conducted into how social media's social characteristics can be used to attract low- and disengaged students to interact in educationally purposeful ways with their high-engaged peers and teachers, ensuring that it contributes to the prosperity of many students (Al-Rahmi et al., 2015). However, data reveal a beneficial association between social media platforms and how they may be utilized to increase learning in a few rare circumstances (Bond et al., 2020).

RESEARCH METHODOLOGY

We sent out 430 questionnaires for the study, and 419 were returned by respondents; after human processing, 7 of the 419 questionnaires were incomplete ("students did not complete the survey") and had to be deleted, leaving 412. Outliers, defined as "data that differs abnormally from other values in a random sample," were found in three of the remaining 412 questionnaire copies put into SPSS, bringing the total number of viable surveys to 409 students (Hair et al., 2012) argued for such exclusions, claiming that outliers might lead to erroneous statistical conclusions and should be removed. For the purpose of the study, we built a conceptual model based on the TAM model to measure student satisfaction and academic performance during the COVID-19 Pandemic.

Instrument Development

Despite the fact that Likert scales are widely used in IS research and have been fully evaluated in marketing and social science, they were utilized to gauge responses in this study (Krejcie and Morgan, 1970; Garland, 1991; Shih, 2004). All of the factors in this study are rated on a five-point Likert scale from 1 to 5: The five alternatives are (1) Strongly disagree, (2) Disagree, (3) Undecided, (4) Agree, and (5) Strongly Agree. When choosing and creating a measuring scale, several elements that affect the scale's reliability, validity, and usability must be taken into account. With the support of a pilot study with students, the questionnaire was fine-tuned and tested ahead of time to examine how students and researchers in higher education felt about using social media for active collaborative learning and engagement, as well as how it influenced their academic performance during the COVID-19 Pandemic. A 30-item questionnaire was prepared after minor layout adjustments, and the online survey was given near the end of the semester in September 2021. In the questionnaire adapted from previous studies, four items extracted from Lee and Yang (2020) were utilized to investigate the usage of social media for collaborative learning. Three questions obtained from the study were used to assess students' use of social media (Shahbaznezhad et al., 2021). To measure PEU, perceived enjoyment, and perceived usefulness, a subset of four questions from Davis et al. (1992) were employed. Students' attitudes toward using social media were assessed using three questions adapted from Davis (1986), four items from Davis et al. (1992), and four items from Davis et al. (1992). Students' academic success was assessed using four items from Davis et al. (1992) and Al-Rahmi et al. (2020b).

Sample Size and Data Collection

In higher education, sampling is a statistical strategy for selecting a subset of individual observations from a population with the goal of influencing student and researcher academic performance during the COVID-19 Pandemic through the use of social media for active involvement and collaborative learning. Random and non-random sampling are the two types of sampling methods. Because a random sample strategy assures that the research target group has an equal chance of being picked, it was adopted in this study.

DATA ANALYSIS AND RESULTS

The empirical analysis of the current study attempts to see how the interrelationships of numerous independent and dependent factors related to using social media for active collaborative learning affect students' and researchers' academic performance during the COVID-19 Pandemic. Structural Equation Modeling was the primary statistical tool employed in the data analysis for a variety of reasons (SEM). When using the SEM, researchers have long contested whether the two-step or one-step procedure is better. The responses that have been authorized are entered into the SPSS software for analysis. This requires coding and data processing. The SPSS application is used to code the data in this investigation. The application of character symbols (mainly numerical symbols) to data is what data coding is all about. The data is modified for acceptability before being entered into SPSS and AMOS-SEM.

Validity and Reliability

A range of statistical approaches, such as the split-half methodology, internal consistency, intra-observer, and test–retest, can be used to investigate reliability (see **Tables 1**, **2**). Individual item and scale reliability were investigated in this work, with scale reliability comprised of three types of measures: internal reliability (IR), composite reliability (CR), and average variance extracted (AVE). IR, are examples of scale reliability. Because internal consistency dependability is a widely used approach, it was adopted in this investigation. IR is critical in

TABLE 1 | Relationship between factors and items (Validity and Reliability).

Relationship between factors and items			Estimate	Composite reliability	Cronbach's alpha	Average variance extracted (AVE)	Squared multiple correlations in (R^2)
Using social media for collaborative learning	<—	SMC4	0.791	0.889	0.893	0.612	
	<—	SMC3	0.876				
	<—	SMC2	0.861				
	<—	SMC1	0.796				
Using social media for engagement	<—	SME3	0.824	0.911	0.907	0.593	
	<—	SME2	0.769				
	<—	SME1	0.722				
Perceived usefulness	<—	PU4	0.771	0.870	0.891	0.637	
	<—	PU3	0.833				
	<—	PU2	0.754				
	<—	PU1	0.747				
Perceived enjoyment	<—	PE4	0.831	0.907	0.897	0.582	
	<—	PE3	0.810				
	<—	PE2	0.814				
	<—	PE1	0.824				
Perceived ease of use	<—	PEU4	0.824	0.900	0.899	0.607	
	<—	PEU3	0.784				
	<—	PEU2	0.860				
	<—	PEU1	0.803				
Attitude to use social media	<—	ATT3	0.881	0.875	0.887	0.650	
	<—	ATT2	0.762				
	<—	ATT1	0.824				
Behavior intention to use social media	<—	BIU4	0.824	0.917	0.911	0.672	
	<—	BIU3	0.821				
	<—	BIU2	0.803				
	<—	BIU1	0.7762				
Students' academic performance	<—	SAP4	0.794	0.921	0.910	0.665	
	<—	SAP3	0.872				
	<—	SAP2	0.891				
	<—	SAP1	0.823				

TABLE 2 | Sample covariances (Group number 1).

Factors	Code	SMC	SME	PU	PE	PEU	ATT	BIU	SAP
Using social media for collaborative learning	SMC	0.910							
Using social media for engagement	SME	0.431	0.832						
Perceived usefulness	PU	0.509	0.452	0.873					
Perceived enjoyment	PE	0.422	0.455	0.392	0.888				
Perceived ease of use	PEU	0.471	0.386	0.409	0.465	0.907			
Attitude to use social media	ATT	0.307	0.471	0.428	0.369	0.495	0.911		
Behavior intention to use social media	BIU	0.494	0.400	0.393	0.419	0.502	0.444	0.923	
Students' academic performance	SAP	0.452	0.332	0.543	0.423	0.309	0.421	0.343	0.898

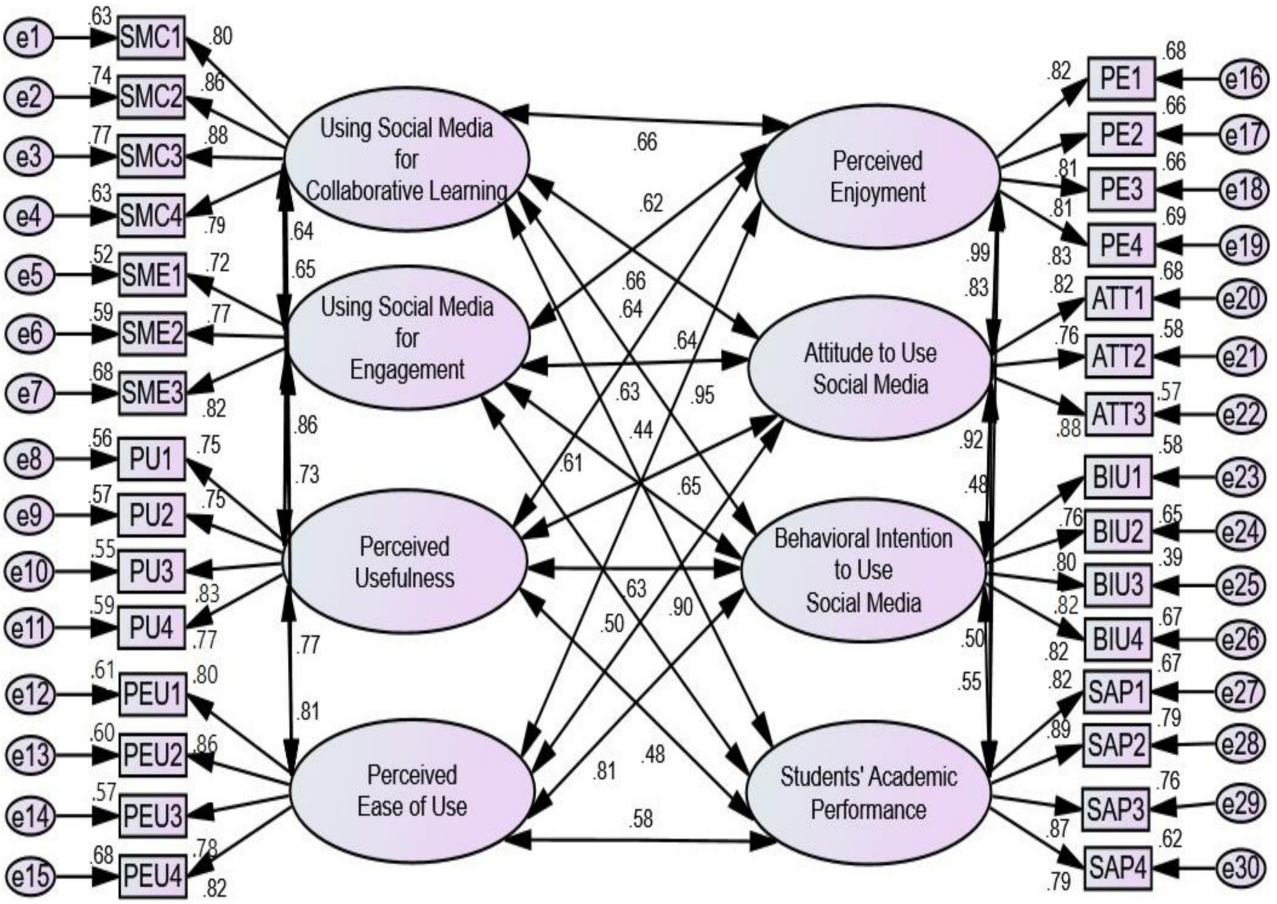

FIGURE 2 | Measurement model.

TABLE 3 | Contrast media-induced nephropathy (CMIN) and the adjusted goodness-of-fit index (AGFI).

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	93	3295.859	372	0.000	8.860
Saturated model	465	0.000	0	0.000	0
Independence model	30	27192.126	435	0.000	62.511
Adjusted goodness-of-fit index (AGFI)					
Tucker- lewis index			TLI	0.000	0.967
Incremental fit index			IFI	0.000	0.934
Comparative fit index			CFI	0.000	0.955
Root-mean-square residual			RMR	0.000	0.032

this study because it involves many item scales (Bryman and Cramer, 2004; Hair et al., 2012). The item is deemed dependable if the squared multiple correlations in (R^2) of each item in the measurement model exceed 0.5. Individual item dependability is established when the standardized loading is equal to or greater than 0.50. Furthermore, the AVE displays the overall amount of variation explained by the hidden construct in the indicators (Hair et al., 2012).

Measurement Model

According to Hair et al. (2012), a range of goodness of fit metrics may be used to evaluate the overall model measure, which are split into three categories: absolute fit measures, incremental fit measures, and parsimonious fit measures. The measurement model is first examined for its validity (unidimensionality, reliability, and validity) using the two-step technique. Second, the structural model will perform further estimations between variables to see whether it matches the observed data (Hair et al., 2012). The adjusted goodness-of-fit index (AGFI), Tucker- Lewis index (TLI), incremental fit index (IFI), and comparative fit index are examples of incremental fit measures (CFI) shown in **Figure 2** and **Table 3**.

Hypothesis Testing

According to Hair et al. (2012), a direct impact is a relationship between two constructions that follows a single path. In other words, it is the direct relationship between variables and their impact on one another. The Critical Ratio (CR) and *p*-value recommendation values for the present research, which contains sixteen direct impacts, must be estimated to guarantee that all routes in the model are supported. To arrive at a suggested value,

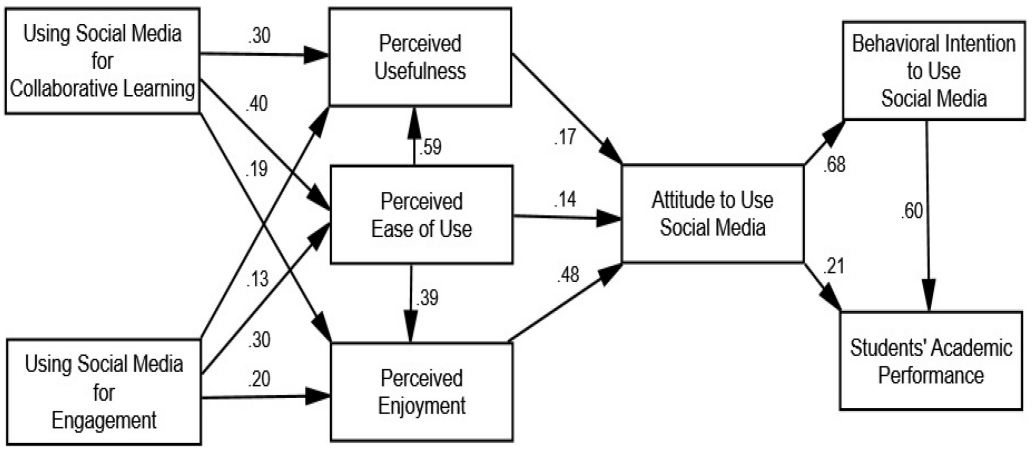

FIGURE 3 | Structural model.

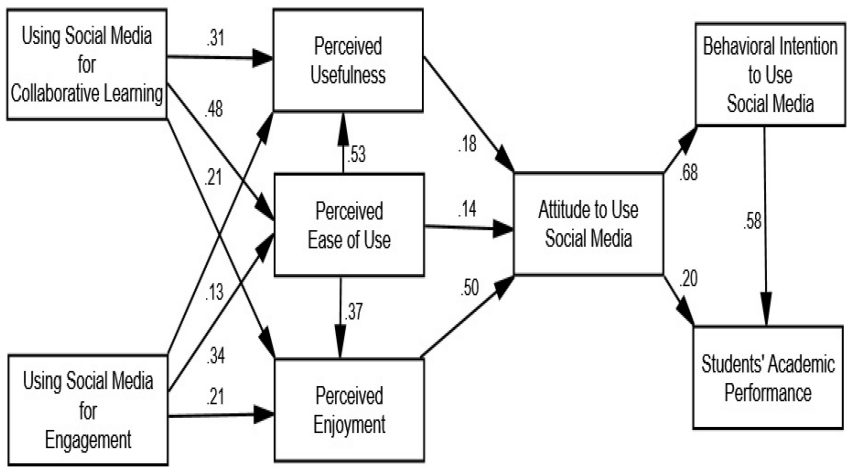

FIGURE 4 | Hypothesis testing.

the CR parameter estimate divided by an estimate of its standard error should be more than 1.96 (see **Figures 3**, **4**, and **Table 4**).

DISCUSSION AND IMPLICATIONS

This study contributes to the existing body of knowledge by using the TAM model to better understand how students utilize social media for collaborative learning and management. Students' communication, participation, and collaboration have all changed as a result of social media. Students are encouraged to learn through social media collaboration and participation, where students and professors interact as well as students and students communicate (Stevens, 2009; Al-Rahmi et al., 2021b). Perceived usefulness, PEU, and perceived enjoyment all exhibited a strong positive relationship with social media use for collaborative learning and engagement, according to our findings. According to these figures, social media has gained in popularity among students due to its simplicity and broad use. Forming groups, transferring resources, communicating with others, and coordinating through social media are all activities that students like. Perceived usefulness and student engagement and collaborative learning; PEU of social media with student engagement and collaborative learning; attitude toward social media; and behavior intention to use social media to influence students' academic performance during the COVID-19 Pandemic all showed a significant positive relationship. Perceived usefulness, ease of use, and enjoyment are all crucial factors in determining whether or not to use a virtual learning environment, according to a previous study (King and He, 2006; Al-Rahmi et al., 2021a). According to the findings of this study, social media or social networking sites may be a beneficial tool for boosting student engagement and cooperation in the construction of learning environments. According to Al-Rahmi et al. (2019a) the technology acceptance model incorporates indicators of collaborative learning such as "reported ease of use" and "perceived usefulness," as well as "engagement," "peer interaction," and "teacher's participation." Finally, research has been conducted on the influence of social media on collaborative learning and participation. However, in this study, the TAM's

TABLE 4 | Regression weights: (Group number 1–Default model).

No	Relationships			Estimate	S.E.	C.R.	P	Results
H1	PU	<—	SMC	0.304	0.023	13.236	0.000	Supported
H2	PEU	<—	SMC	0.401	0.021	18.704	0.000	Supported
H3	PE	<—	SMC	0.189	0.026	7.413	0.000	Supported
H4	PU	<—	SME	0.131	0.022	6.057	0.000	Supported
H5	PEU	<—	SME	0.296	0.021	13.889	0.000	Supported
H6	PE	<—	SME	0.201	0.026	7.756	0.000	Supported
H7	PU	<—	PEU	0.592	0.024	24.215	0.000	Supported
H8	PE	<—	PEU	0.394	0.029	13.450	0.000	Supported
H9	ATT	<—	PU	0.167	0.026	6.349	0.000	Supported
H10	ATT	<—	PEU	0.141	0.030	4.673	0.000	Supported
H11	ATT	<—	PE	0.480	0.023	20.861	0.000	Supported
H12	BIU	<—	ATT	0.684	0.019	35.061	0.000	Supported
H13	SAP	<—	ATT	0.207	0.026	7.834	0.000	Supported
H14	SAP	<—	BIU	0.601	0.027	22.276	0.000	Supported

major elements of PEU, perceived enjoyment, and perceived usefulness were employed as predictors of student social media usage. It has been proposed that a student's use of social media predicts their attitude toward it, their behavior while using it, and their academic accomplishment. The following are the key conclusions of the study: PEU influences students' attitudes toward using social media, as well as their behavior intending to use social media and academic accomplishment. This study's findings are comparable, but not identical, to those of earlier investigations. The direct and indirect impacts of PEU on social media enjoyment and utility are investigated in this study. Active technology usage for educational purposes is on the rise, according to the research, and has a substantial influence on collaborative learning and student engagement (Al-Rahmi et al., 2019b). Collaborative learning and student engagement influenced reported ease of use, perceived enjoyment, and perceived usefulness in this study. Furthermore, the attraction, practicality, and ease of use of social media have an indirect influence on collaborative learning and student participation. All of these linkages were examined using a single model. According to our findings, perceived usefulness, ease of use, and enjoyment have a substantial impact on students' attitudes about social media, as well as their behavior intention to use social media to improve academic performance during the COVID-19 Pandemic. Due to its simplicity and widespread usage, social media has grown in popularity among students, according to these statistics. Social media is also popular among students, who utilize it for engagement, resource sharing, and collaborative learning. There was also a substantial positive association between the perceived usefulness and enjoyment of using social media for collaborative learning and engagement.

Conclusion and Future Work

This study updates the TAM Model to better understand students' views regarding social media and their plans to use it to improve their academic performance during the COVID-19 Pandemic. The findings suggest that utilitarian orientations to a social media site's perceived utility, enjoyment, and ease of use are important determinants of collaborative learning and student engagement, which is a driver of students' academic performance during the COVID-19 Pandemic. Using the TAM model, we found a link between students' attitudes about social media and their behavior intention to use in the context of social media usage for education during the COVID-19 Pandemic. We studied and included additional crucial elements, such as using social media for collaborative learning and students' participation, to make the TAM model more meaningful in the context of understanding the acceptance and usage of social media to affect students' academic performance during the COVID-19 Pandemic. A structural equation modeling (SEM) approach and a 30-question online questionnaire were used to analyze these characteristics. Students' perceptions of social media's usefulness, enjoyment, and ease of use are positively influenced by collaborative learning and engagement, according to the findings; three variables influenced students' attitudes toward social media and intentions to use it to improve their academic performance during the COVID-19 pandemic. In addition, the following four categories of strategic recommendations were discussed: using social media as a platform for education learning during the COVID-19 pandemic; using social media as a platform for collaboration and student engagement; social media as a useful, enjoyable, and easy-to-use platform; students' attitudes toward social media and intentions to use it to improve their academic performance during the COVID-19 Pandemic. When these approaches are paired with a set of standards for using social media in higher education, students may be able to perform better in class. According to the current study, future research could incorporate other and additional variables to analyze the impact of various aspects on students' academic performance during the COVID-19 Pandemic through the use of social media for collaborative learning and student engagement. Future research should look into additional studies and variables that influence the usage of social media for collaborative learning and participation in order to improve students' academic performance during the COVID-19 Pandemic (e.g., environmental and cultural).

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 have contributions, read and agreed to the published version of the manuscript.

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REFERENCES

Abbasi, G. A., Jagaveeran, M., Goh, Y. N., and Tariq, B. (2021). The impact of type of content use on smartphone addiction and academic performance: physical activity as moderator. *Technol. Soc.* 64:101521. doi: 10.1016/j.techsoc.2020.101521

Abdillah, L., Handayani, T., Rosalyn, E. R., and Mukti, Y. I. (2020). Collaborating digital social media for teaching science and Arabic in higher education during COVID-19 pandemic. *Ijaz Arabi J. Arabic Learn.* 4, 12–25.

Abdullah, F., Ward, R., and Ahmed, E. (2016). Investigating the influence of the most commonly used external variables of TAM on students' perceived ease of use (PEOU) and perceived usefulness (PU) of e-portfolios. *Comput. Hum. Behav.* 63, 75–90. doi: 10.1016/j.chb.2016.05.014

Acharya, S., and Ganesan, P. (2019). Factors that affect students' intention and use of technology: an assessment of UTAUT2 in the context of YouTube video forwarding behaviour. *Int. Journal of Bus. Emerg. Mark.* 11, 348–367. doi: 10.1504/ijbem.2019.105231

Alamri, M. M., Almaiah, M. A., and Al-Rahmi, W. M. (2020). The role of compatibility and task-technology fit (TTF): on social networking applications (SNAs) usage as sustainability in higher education. *IEEE Access* 8, 161668–161681. doi: 10.1109/access.2020.3021944

Ali Qalati, S., Li, W., Ahmed, N., Ali Mirani, M., and Khan, A. (2021). Examining the factors affecting SME performance: the mediating role of social media adoption. *Sustainability* 13:75. doi: 10.3390/su13010075

Aljuboori, A. F., Fashakh, A. M., and Bayat, O. (2020). The impacts of social media on university students in Iraq. *Egypt. Inform. J.* 21, 139–144. doi: 10.1016/j.eij.2019.12.003

Al-Rahmi, A. M., Al-Rahmi, W. M., Alturki, U., Aldraiweesh, A., Almutairy, S., and Al-Adwan, A. S. (2021a). Exploring the factors affecting mobile learning for sustainability in higher education. *Sustainability* 13:7893. doi: 10.3390/su13147893

Al-Rahmi, A. M., Shamsuddin, A., Alturki, U., Aldraiweesh, A., Yusof, F. M., Al-Rahmi, W. M., et al. (2021b). The influence of information system success and technology acceptance model on social media factors in education. *Sustainability* 13:7770. doi: 10.3390/su13147770

Al-Rahmi, W. M., and Zeki, A. M. (2017). A model of using social media for collaborative learning to enhance learners' performance on learning. *J. King Saud Univ. Comput. Inf. Sci.* 29, 526–535. doi: 10.1016/j.jksuci.2016.09.002

Al-Rahmi, W. M., Alias, N., Othman, M. S., Marin, V. I., and Tur, G. (2018a). A model of factors affecting learning performance through the use of social media in Malaysian higher education. *Comput. Educ.* 121, 59–72. doi: 10.1016/j.compedu.2018.02.010

Al-Rahmi, W. M., Yahaya, N., Alamri, M. M., Aljarboa, N. A., Kamin, Y. B., and Moafa, F. A. (2018b). A model of factors affecting cyber bullying behaviors among university students. *IEEE Access* 7, 2978–2985. doi: 10.1109/access.2018.2881292

Al-Rahmi, W. M., Othman, M. S., and Yusuf, L. M. (2015). Effect of engagement and collaborative learning on satisfaction through the use of social media on Malaysian higher education. *Res. J. Appl. Sci. Eng. Technol.* 9, 1132–1142. doi: 10.19026/rjaset.9.2608

Al-Rahmi, W. M., Yahaya, N., Alamri, M. M., Alyoussef, I. Y., Al-Rahmi, A. M., and Kamin, Y. B. (2019a).). Integrating innovation diffusion theory with technology acceptance model: supporting students' attitude towards using a massive open online courses (MOOCs) systems. *Interact. Learn. Environ.* 29, 1–13. doi: 10.1007/978-981-287-532-7_219-1

Al-Rahmi, W. M., Yahaya, N., Aldraiweesh, A. A., Alturki, U., Alamri, M. M., Saud, M. S. B., et al. (2019b). Big data adoption and knowledge management sharing: an empirical investigation on their adoption and sustainability as a purpose of education. *IEEE Access* 7, 47245–47258. doi: 10.1109/access.2019.2906668

Al-Rahmi, W. M., Yahaya, N., Alturki, U., Alrobai, A., Aldraiweesh, A. A., Omar Alsayed, A., et al. (2020a). Social media–based collaborative learning: the effect on learning success with the moderating role of cyberstalking and cyberbullying. *Interact. Learn. Environ.* 29, 1–27. doi: 10.1080/10494820.2020.1728342

Al-Rahmi, W. M., Alzahrani, A. I., Yahaya, N., Alalwan, N., and Kamin, Y. B. (2020b). Digital communication: information and communication technology (ICT) usage for education sustainability. *Sustainability* 12:5052. doi: 10.1016/j.giq.2018.12.008

Anser, M. K., Zaigham, G. H. K., Imran Rasheed, M., Pitafi, A. H., Iqbal, J., and Luqman, A. (2020). Social media usage and individuals' intentions toward adopting bitcoin: the role of the theory of planned behavior and perceived risk. *Int. J. Commun. Syst.* 33:e4590. doi: 10.1002/dac.4590

Awidi, I. T., Paynter, M., and Vujosevic, T. (2019). Facebook group in the learning design of a higher education course: an analysis of factors influencing positive learning experience for students. *Comput. Educ.* 129, 106–121. doi: 10.1016/j.compedu.2018.10.018

Binyamin, S. S., Rutter, M., and Smith, S. (2019). Extending the technology acceptance model to understand students' use of learning management systems in Saudi higher education. *Int. J. Emerg. Technol. Learn.* 14, 4–21. doi: 10.3991/ijet.v14i03.9732

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., and Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: a systematic evidence map. *Int. J. Educ. Technol. High. Educ.* 17, 1–30. doi: 10.4018/978-1-7998-0119-1.ch001

Bouton, E., Tal, S. B., and Asterhan, C. S. (2021). Students, social network technology and learning in higher education: visions of collaborative knowledge construction vs. the reality of knowledge sharing. *Internet High. Educ.* 49:100787. doi: 10.1016/j.iheduc.2020.100787

Bryman, A., and Cramer, D. (2004). *Quantitative Data Analysis with SPSS 12 and 13: A Guide for Social Scientists*. Abingdon: Routledge.

Bui, T. X. T., Ha, Y. N., Nguyen, T. B. U., Nguyen, V. U. T., and Ngo, T. C. T. (2021). A Study on collaborative online learning among EFL students in van lang university (VLU). *AsiaCALL Online J.* 12, 9–21.

Cañabate, D., Bubnys, R., Nogué, L., Martínez-Mínguez, L., Nieva, C., and Colomer, J. (2021). Cooperative learning to reduce inequalities: instructional approaches and dimensions. *Sustainability* 2021:10234. doi: 10.3390/su131810234

Chatterjee, R., and Correia, A. P. (2020). Online students' attitudes toward collaborative learning and sense of community. *Am. J. Distance Educ.* 34, 53–68. doi: 10.1080/08923647.2020.1703479

Cheung, R., and Vogel, D. (2013). Predicting user acceptance of collaborative technologies: an extension of the technology acceptance model for e-learning. *Comput. Educ.* 63, 160–175. doi: 10.1016/j.compedu.2012.12.003

Clapp, J., DeCoursey, M., Lee, S. W. S., and Li, K. (2021). "Something fruitful for all of us": social annotation as a signature pedagogy for literature education. *Arts Humanit. High. Educ.* 20, 295–319. doi: 10.1177/1474022220915128

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* 13, 319–340. doi: 10.2307/249008

Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Manag. Sci.* 35, 982–1003. doi: 10.1287/mnsc.35.8.982

Davis, F. D., Baozzi, R. P., and Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *J. Appl. Soc. Psychol.* 22, 1111–1132.

Davis, S. G. (1986). *Parades and Power: Street Theatre in Nineteenth-Century Philadelphia.* Philadelphia, PA: Temple University Press, 5.

Dlalisa, S. F., and van Niekerk, B. (2015). "Factors affecting the post implementation adoption and usage of blackboard amongst academics at dut," in *Proceedings of the 9th Annual teaching and learning in higher education conference* Durban.

Dzogbenuku, R. K., Doe, J. K., and Amoako, G. K. (2021). Social media information and student performance: the mediating role of hedonic value (entertainment). *J. Res. Innov. Teach. Learn.* 15, 132–146.

Faura-Martínez, U., Lafuente-Lechuga, M., and Cifuentes-Faura, J. (2021). Sustainability of the Spanish university system during the pandemic caused by COVID-19. *Educ. Rev.* 73, 1–10. doi: 10.1001/jamainternmed.2022.0033

Fokides, E. (2017). Greek pre-service teachers' intentions to use computers as in-service teachers. *Contemp. Educ. Technol.* 8, 56–75.

Garland, R. (1991). The mid-point on a rating scale: is it desirable. *Mark. Bull.* 2, 66–70.

Ghani, N. A., Hamid, S., Hashem, I. A. T., and Ahmed, E. (2019). Social media big data analytics: a survey. *Comput. Hum. Behav.* 101, 417–428.

Greenhow, C., Galvin, S. M., Brandon, D. L., and Askari, E. (2020). A decade of research on K–12 teaching and teacher learning with social media: insights on the state of the field. *Teach. Coll. Rec.* 122, 1–72. doi: 10.1177/016146812012200602

Hair, J. F., Sarstedt, M., Ringle, C. M., and Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *J. Acad. Mark. Sci.* 40, 414–433. doi: 10.1007/s11747-011-0261-6

Hamadi, M., El-Den, J., Azam, S., and Sriratanaviriyakul, N. (2021). Integrating social media as cooperative learning tool in higher education classrooms: an empirical study. *J. King Saud Univ. Comput. Inf. Sci.* 33, 1–10.

Junco, R., Elavsky, C. M., and Heiberger, G. (2013). Putting twitter to the test: assessing outcomes for student collaboration, engagement and success. *Br. J. Educ. Technol.* 44, 273–287. doi: 10.1111/j.1467-8535.2012.01284.x

Khan, A. B., and Mansoor, H. S. (2020). Integrated collaborative learning approach (ICLA): conceptual framework of pedagogical approach for the integration of language skills. *Competit. Soc. Sci. Res. J.* 1, 14–28.

Khan, M. N., Ashraf, M. A., Seinen, D., Khan, K. U., and Laar, R. A. (2021). Social media for knowledge acquisition and dissemination: the impact of the COVID-19 pandemic on collaborative learning driven social media adoption. *Front. Psychol.* 12. doi: 10.3389/fpsyg.2021.648253

King, W., and He, J. (2006). A meta-analysis of the technology acceptance model. *Inf.Manag.* 43, 740–755. doi: 10.1016/j.im.2006.05.003

Krejcie, R. V., and Morgan, D. W. (1970). Determining sample size for research activities. *Educ. Psychol. Meas.* 30(3), 607-610. doi: 10.1177/001316447003000308

Lee, W. W. S., and Yang, M. (2020). Effective collaborative learning from Chinese students' perspective: a qualitative study in a teacher-training course. *Teach.High. Educ.* 24, 1–17. doi: 10.1080/13562517.2020.1790517

Liang, H. Y., Hsu, T. Y., Hwang, G. J., Chang, S. C., and Chu, H. C. (2021). A mandatory contribution-based collaborative gaming approach to enhancing students' collaborative learning outcomes in science museums. *Interact. Learn. Environ.* 29, 1–15. doi: 10.1080/10494820.2021.1897845

Manca, S. (2020). Snapping, pinning, liking or texting: investigating social media in higher education beyond facebook. *Internet High. Educ.* 44:100707. doi: 10.1016/j.iheduc.2019.100707

Mantle-Bromley, C. (1995). Positive attitudes and realistic beliefs: links to proficiency. *Mod. Lang. J.* 79, 372–386. doi: 10.1111/j.1540-4781.1995.tb01114.x

Martinho, D. S., Santos, E. M., Miguel, M. I., and Cordeiro, D. S. (2018). Factors that influence the adoption of postgraduate online courses. *Int. J. Emerg. Technol. Learn.* 13, 123–141. doi: 10.3991/ijet.v13i12.8864

Masood, A., Luqman, A., Feng, Y., and Ali, A. (2020). Adverse consequences of excessive social networking site use on academic performance: explaining underlying mechanism from stress perspective. *Comput. Hum. Behav.* 113:106476. doi: 10.1016/j.chb.2020.106476

Meintjes, H. H., and van Wyk, M. M. (2020). "Facebook page as a digital pedagogical tool in the business studies class," in *Handbook of Research on Digital Learning*, ed. Matthew M (Hershey PA: IGI Global), 57–74. doi: 10.4018/978-1-5225-9304-1.ch004

Moon, J., and Kim, Y. (2001). Extending the TAM for a world-wide-web context. *Inf. Manag.* 38, 217–230. doi: 10.1089/tmj.2019.0048

Moran, G., Muzellec, L., and Johnson, D. (2019). Message content features and social media engagement: evidence from the media industry. *J. Prod. Brand Manag.* 29, 533–545.

Mostafa, F. (2020). *Teachers' Perceptions of Professional Learning Through Social Media in Environmental Education (*Doctoral dissertation*)* The University of Waikato: Hamilton.

Phuthong, T. (2021). Antecedents influencing the adoption of collaborative learning social-media platforms among Thai University students during the Covid-19 'new normal'era. *Int. J. Emerg. Technol. Learn.* 16, 108–127. doi: 10.3991/ijet.v16i13.18083

Pitafi, A. H., Kanwal, S., and Khan, A. N. (2020). Effects of perceived ease of use on SNSs-addiction through psychological dependence, habit: the moderating role of perceived usefulness. *Int. J. Bus. Inf. Syst.* 33, 383–407. doi: 10.1504/ijbis.2020.10027455

Rahman, S., Ramakrishnan, T., and Ngamassi, L. (2020). Impact of social media use on student satisfaction in higher education. *High. Educ. Q.* 74, 304–319. doi: 10.1111/hequ.12228

Rahmi, B. A. K. İ, and Birgören, B. (2020). Analysis of the studies on e-learning acceptance of learners in the Middle East and the proposal of an extended technology acceptance model. *Kastamonu Eğitim Dergisi* 28, 1977–1986. doi: 10.24106/kefdergi.4169

Rasheed, M. I., Malik, M. J., Pitafi, A. H., Iqbal, J., Anser, M. K., and Abbas, M. (2020). Usage of social media, student engagement, and creativity: the role of knowledge sharing behavior and cyberbullying. *Comput.Educ.* 159:104002. doi: 10.1016/j.compedu.2020.104002

Rauniar, R., Rawski, G., Yang, J., and Johnson, B. (2014). Technology acceptance model (TAM) and social media usage: an empirical study on facebook. *J. Enterp. Inf. Manag.* 27, 6–30. doi: 10.1108/jeim-04-2012-0011

Raza, S. A., Qazi, W., Umer, B., and Khan, K. A. (2020). Influence of social networking sites on life satisfaction among university students: a mediating role of social benefit and social overload. *Health Educ.* 120, 141–164.

Rupak, R., Greg, R., Jei, Y., and Ben, J. (2014). Technology acceptance model (TAM) and social media usage: an empirical study on Facebook. *J. Enterp. Inf. Manag.* 27, 6–30. doi: 10.1108/jeim-04-2012-0011

Sa'nch, R. A., Cortijo, V., and Javed, U. (2014). Students' perceptions of facebook for academic purposes. *Comput. Educ.* 70, 138–149. doi: 10.1016/j.compedu.2013.08.012

Sakurai, R., Nemoto, Y., Mastunaga, H., and Fujiwara, Y. (2021). Who is mentally healthy? Mental health profiles of Japanese social networking service users with a focus on LINE, facebook, twitter, and instagram. *PLoS One* 16:e0246090. doi: 10.1371/journal.pone.0246090

Scherer, R., Siddiq, F., and Tondeur, J. (2019). The technology acceptance model (TAM): a meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Comput. Educ.* 128, 13–35. doi: 10.1016/j.compedu.2018.09.009

Shahbaznezhad, H., Dolan, R., and Rashidirad, M. (2021). The role of social media content format and platform in users' engagement behavior. *J. Interact. Mark.* 53, 47–65. doi: 10.1016/j.intmar.2020.05.001

Shen, X. L., Li, Y. J., Sun, Y., and Wang, F. (2021). Good for use, but better for choice: a relative model of competing social networking services. *Inf. Manag.* 58, 103448. doi: 10.1016/j.im.2021.103448

Shih, H. P. (2004). An empirical study on predicting user acceptance of e-shopping on the Web. *Inf. Manag.* 41, 351–368. doi: 10.1016/S0378-7206(03)00079-X

Sohaei, S., Mirabolghasemi, M., and Gohari, M. M. (2020). Adoption of educational social network sites in teaching and learning: a task-technology fit perspective. *J. Soft Comput. Decis. Support Syst.* 8, 1–11. doi: 10.4018/978-1-4666-6347-3.ch001

Stevens, V. (2009). Modeling social media in groups, communities, and networks. *Tesl-Ej* 13, 1–16. doi: 10.1163/9789047401780_004

Stockdale, L. A., and Coyne, S. M. (2020). Bored and online: reasons for using social media, problematic social networking site use, and behavioral outcomes across the transition from adolescence to emerging adulthood. *J. Adolesc.* 79, 173–183. doi: 10.1016/j.adolescence.2020.01.010

Sujeet, K. S., and Jyoti, K. C. (2013). 'Technology acceptance model for the use of learning through websites among students in Oman'. *Int. Arab J. E-Technol.* 4:2013.

Tajvidi, R., and Karami, A. (2021). The effect of social media on firm performance. *Comput.Hum. Behav.* 115:105174. doi: 10.1016/j.chb.2017.09.026

Talib, M. A., Bettayeb, A. M., and Omer, R. I. (2021). Analytical study on the impact of technology in higher education during the age of COVID-19: systematic literature review. *Educ. Inf. Technol.* 26, 6719–6746. doi: 10.1007/s10639-021-10507-1

Tang, Y. M., Chen, P. C., Law, K. M., Wu, C. H., Lau, Y. Y., Guan, J., et al. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Comput. Educ.* 168:104211. doi: 10.1016/j.compedu.2021.104211

Tosuntaş, S. B., Karadag, B. E., and Orhan, S. (2015). The factors affecting acceptance and use of interactive whiteboard within the scope of FATIH project: a structural equation model based on the unified theory of acceptance and use of technology. *Comput. Educ.* 81:169e178.

Triandis, H. C. (1971). *Attitude and Attitude Change. Wiley Foundations of Social Psychology Series*. New York, NY: Wiley.

Van Den Beemt, A., Thurlings, M., and Willems, M. (2020). Towards an understanding of social media use in the classroom: a literature review. *Technol. Pedagogy Educ.* 29, 35–55. doi: 10.1080/1475939x.2019.1695657

Venkatesh, V., and Davis, F. D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Manag. Sci.* 46, 186–204. doi: 10.1287/mnsc.46.2.186.11926

Wang, W. T., and Wang, C. C. (2009). An empirical study of instructor adoption of web-based learning systems. *Comput. Educ.* 53, 761–774. doi: 10.1016/j.compedu.2009.02.021

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