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Charting our new path in education in a post-pandemic world

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Charting our new path in education in a post-pandemic world

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Editorial: Charting our new path in education in a post-pandemic world

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Editorial on the Research Topic
Charting our new path in education in a post-pandemic world

In the spring of 2020, and COVID-19 reached pandemic status, the entire education community was forced into an unplanned online learning experiment. With the sudden closure of schools and move to remote instruction and virtual learning with little adjustment, teachers, administrators, and students suddenly found themselves in uncharted territory. Education reporter Mangrum (2020) noted "The COVID-19 pandemic has exacerbated a lot of problems facing public schools—but it didn't create most of them. Most of the inequities existed long before the pandemic. The only difference is who was affected and who was paying attention." UNESCO reported that the pandemic has caused educational disruption and school closures for over 1.2 billion students (Giannini and Brandolino, 2020). The effects of this educational disruption are just beginning to be measured and will likely have ripple effects for years to come.

To address this unprecedented, rapid change in education, a Research Topic to inform the broader international educational community was opened for articles related to the conditions and shifts in classrooms related to assessment, standards of education, gaps in learning, innovative approaches to learning, and support of emerging alternative methods of learning. A total of 15 manuscripts were received and assessed for inclusion based on their relevance to the educational challenges during the COVID-19 time period. To help educators make their way in the new challenges of pandemic-disrupted education, we sought articles to illuminate innovative, collaborative, ethical, and effective educational practices in virtual and hybrid teaching contexts. Twelve manuscripts were accepted.

We identified four broad categories of manuscripts from those received: Impact on instructors, impact on student's knowledge and skills, impact on teaching practices, and focus on administrative practices.

Impact on instructors

Besides missing the human connection and contact with students, instructors experienced fatigue with using new technology to teach virtually and asynchronously. They also experienced frustrations related to the factors that stood between them and their ability to support their student's social-emotional growth and wellness as a result of the pandemic. Regardless of these barriers, they also found creative ways to connect with students, extend instruction, and solve problems. Sahito et al. addressed the perception of university teachers about online teaching during COVID-19, the challenges, issues, and problems faced by university teachers and how to cope to overcome the issues, challenges, and problems posed by the pandemic. Zara et al. explored the concept of pedagogical resilience in Thailand and the Philippines concerning teachers' personal, professional, and social attitudes toward teaching and learning during the COVID-19 pandemic. This study highlights the resilience, the mental resistance to difficulties and stresses that teachers exhibited as they planned for how they would respond to the pandemic and both navigate and survive the challenges. Woltran et al. evaluated the perception of Austrian elementary school teachers when distance teaching and the challenges they faced due to COVID-19 that included a lack of personal contact with students; additional workload and more stress, a lack of technical equipment and digital skills; and an inability to offer individual support for students at risk. Finally Sokal and Parmigiani used a newly developed set of global competence rubrics to explore the relationships between 115 teacher candidates' global competence, demographic variables, and programmatic variables within their teacher education program. The restrictions on travel necessitated by the pandemic do not prevent virtual exchanges, and this study illuminates the many online project-based learning activities that allowed teachers to facilitate intercultural collaborative projects and school-based global consciousness learning opportunities. These are noted for their capacity to develop empathy, co-operation, negotiation, leadership, and social awareness.

Impact on students

The impacts on students' knowledge and skills caused by the pandemic include academic, behavioral, and emotional areas in university and K-12 settings. Garrad and Page conducted research on student perceptions of learning of an online postgraduate degree course where the authors examined the impact of the design restructure on student perceptions of learning within the course. Classroom expectations remain integral to positive learning environments, whether virtual or in person. Croce and Salter outlined the importance of teaching classroom expectations and provided four factors to consider in virtual settings to help children transition into brick-and-mortar environments.

Impact on teaching practices

Perspectives and pedagogical methods that influence teaching practices shifted and evolved as a result of the pandemic. Cobo-Rendón et al. gave six recommendations for implementation to ensure blended learning improves teaching practices. Rissanen et al. analyzed the impact of growth mindset pedagogy on the teacher's pedagogical thinking and practices in Finland. They found significant differences between fixed-mindset and growth-mindset teachers. Those teachers who utilized growth mindsets produced deep reflections in ways to use these tools to support students' emotion regulation and generate ideas about how to normalize hardship in learning in unique and useful ways. Notably, GMP offered them tools for working particularly with students whom they had learned to identify as suffering from motivational and emotional problems related to a fixed mindset. Anderson et al. focused attention on two aspects of teacher support and development: creativity and wellbeing and how these are especially important in light of the ongoing COVID-19 pandemic and the secondary traumatic stress that teachers inevitably experienced. After engaging in online professional development, teachers' creative agency in the classroom increased, replicating some of the results from a pre-pandemic study (Anderson et al.). Campillo-Ferrer and Miralles-Martínez examined teachers' development of low-order cognitive skills with content and language integrated learning in Spain. They analyzed three individual cognitive categories used to foster student's understanding of content in both public and private schools in foreign language and content acquisition in non-language areas. They provided teachers perceptions of the daily challenges making adjustments with space, time and materials available.

Impacts on administration

Administrative focus and practices underwent changes as a result of challenges in the post pandemic world. Facing an administrative audit for an academic program is challenging even under normal circumstances. Kline reviewed the challenges posed by pandemic requirements forcing creation of online meetings for participating partners in local and remote areas to facilitate the academic review process. Kline also discussed utilization of online tools for gathering of data needed during the review process. Administrative implications for instructional practices in delivery options for graduate students in master's programs also include implications for evolving policy requirements. Another administrative strategy that emerged during

the pandemic was reported by Elfarargy et al. To meet the need of training faculty, use of virtual learning was necessitated during the pandemic. Texas mandated face-to-face training expanded to virtual training to allow for equity and convenience.

As we chart a course forward post pandemic, there are many aspects of education to reconsider. As a result, this is an ideal opportunity to pause, reflect on the lessons learned during this health crisis and work together in partnerships between K-12 schools and teacher preparation programs to collaboratively determine the path ahead. As we collectively consider ways to improve, the researchers in this special issue have provided studies to push our thinking on a number of topics that impact students, teachers, administrators, and pedagogical approaches. Now is the time to reconsider and revise our teaching methods and strategies, our pathways for both teacher and student recruitment, retention and incentive practices, assessment, and accreditation approaches. Citing a Rand study conducted in January of 2021, Zamarro et al. suggested that teachers' levels of stress and burnout have reached all-time highs starting during the pandemic, but are still continuing. "In March 2021, 42% of teachers declared they had considered leaving or retiring from their current position during the last year. Of these, slightly more than half say it was because of COVID-19" (Zamarro et al., 2022). As alarms now sound suggesting there is no end to the steep increases in teacher turnover and growing teacher shortages it is imperative that we consider what opportunities can be found amidst these new challenges for the next phase.

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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We want to thank the researchers who submitted to this Research Topic. The impact of the pandemic on education has provided numerous topics, challenges, and solutions to help inform educators around the World.

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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ORIGINAL RESEARCH
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Implementing and Evaluating Growth Mindset Pedagogy – A Study of Finnish Elementary School Teachers

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This article presents a study of five teachers at a Finnish elementary school who implemented and evaluated growth mindset pedagogy (GMP). The teachers received GMP training and conducted student interventions in their classrooms. We analyzed the impact of GMP on the teacher's pedagogical thinking and practices and found significant differences between fixed-mindset and growth-mindset teachers in the ways they internalized and applied GMP principles. The most important value of GMP was seen in its impact on emotion regulation through the normalization of hardship in learning. We discuss the dangers of a superficial understanding of growth mindsets in education.

Keywords: mindset theory, growth mindset pedagogy, Finnish teachers, elementary schools, intervention

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INTRODUCTION: MINDSET THEORY AND CURRENT TRENDS

According to Dweck's theory on implicit beliefs about the nature of basic human qualities related to learning (Dweck, 2000; Dweck, 2006), teachers and students may either have a fixed mindset (entity theory) and believe that their basic qualities are stable and unchangeable, or a growth mindset (incremental theory), meaning that such qualities are considered changeable and open to development. An extensive body of research demonstrates the impact of mindset on motivation and learning, and particularly on the resilience that learning requires (Yeager and Dweck, 2012). Much of this work focuses on the role of implicit theories in motivation and achievement, but associations between a growth mindset and both adjustment and emotional well-being in school have also been reported (King, 2012; King et al., 2012). Dweck's theory has also provided a framework for brain research, where it has been shown that students with a growth mindset recover from mistakes faster than those with a fixed mindset measured in terms of error-monitoring event-related brain potentials (ERP) (Moser et al., 2011; Schroder et al., 2017).

Nevertheless, it is possible to change mindset-related meaning systems through relatively short interventions (Dweck and Yeager, 2019). The latest and most impressive study offering more evidence of the predictive capacity of mindset-related meaning systems was conducted by Yeager et al. (2019) in the U.S. This large-scale, preregistered, nation-wide, intervention study – published in Nature – included 12,490 ninth-grade adolescents and reported undisputedly beneficial effects from a short online mindset intervention. Grades among lower-achieving students improved, and overall enrollment on advanced mathematics courses increased. Moreover, although the effect sizes may seem small or moderate relative to laboratory study benchmarks, they are impressive when measured against other longitudinal outcomes of real-world interventions with heterogeneous samples (Dweck and Yeager, 2019; Yeager et al., 2019).

While mindset theory is widely applied, with advocates throughout the world, it has also been criticized. For example, in contrast to Dweck's results, some empirical studies have found no

significant correlation between mindset, motivation, and achievement (e.g., Leondari and Gialamas, 2002; Robins and Pals, 2002; Dupeyrat and Mariné, 2005; Burgoyne et al., 2020; McCabe et al., 2020). Moreover, in some cases, even when the mindset effects were replicated, they seemed far weaker than in the original studies (e.g., Zhang et al., 2017a). The reasons for these unsuccessful replications and inconsistent results are not fully understood, but there are several potential causes. The first is the general shift in mindset research from laboratory to real-world settings. In addition, interventions do not necessarily affect all students equally: they are typically stronger for "high-risk" students and more moderate for others (Paunesku et al., 2015; Broda et al., 2018). Furthermore, the short interventions that have produced significant results underwent several rounds of development and testing and were very carefully matched to the target populations (Dweck and Yeager, 2019).

The atmosphere and interactions in the learning environment also mediate the results of mindset interventions (Burke and Williams, 2012; Yeager et al., 2019). It is generally known that the mindsets of children may be strongly influenced by the feedback they receive from the environment (Pomerantz and Kempner, 2013). The mindsets of teachers (Rattan et al., 2012; Canning et al., 2019; Bostwick et al., 2020) and, in turn, their feedback style (Schmidt et al., 2015; Zeeb et al., 2020) as well as parental praising styles (Gunderson et al., 2013; Park et al., 2016) also influence mindset development, motivation, and achievement among students. For these reasons, the development of "growth mindset cultures" could be considered a necessary next step to achieving more stable and effective outcomes in the research field. However, this has proved a far from simple task. For instance, Carol Dweck recently discussed observations of teachers creating a "false growth mindset," indications of which include, for example, equating a growth mindset simply with effort and then praising effort even in the absence of progress, as well as teaching about growth and learning opportunities but failing to provide students with the necessary help (e.g., strategies) and resources (Dweck and Yeager, 2019).

In sum, recent research shows that the relationship between a growth mindset and academic achievement and motivation is complex and not thoroughly understood. In particular, the risk of oversimplified applications has become evident since the shift in focus to real-world settings. As Dweck and Yeager (2019) state:

> This may sound strange to say after decades of research, but we still know far too little about how best to transmit a growth mindset to individuals, how contexts determine whether students take up and apply a new mindset, or how to help embed a growth mindset in the cultures of schools and organizations. Research into these issues is critical because we have learned that it is too easy for people to implement a growth mindset poorly (p. 481).

The current study is motivated by the acknowledged need to acquire a more nuanced understanding of the pitfalls and opportunities involved in developing growth-mindset cultures in real-world educational settings in different educational contexts. We therefore focused our previous research on a deep case analysis of the pedagogical thinking and practices of several Finnish teachers with different mindsets, and considered the "critical points" in the practices of highly educated and experienced teachers with growth and mixed mindsets (Rissanen et al., 2018a; Rissanen et al., 2018b; Rissanen et al., 2019). On the basis of these studies and the previous literature we have identified the key aspects of "growth mindset pedagogy" in basic education. We continue this iterative process of developing the pedagogy in the present article: the study concerns five Finnish teachers with different mindsets and their experiences of learning and implementing growth mindset pedagogy.

GROWTH MINDSET PEDAGOGY

Our conceptualization of growth mindset pedagogy (henceforth GMP) builds on the understanding that mindsets create "meaning systems." Malleability beliefs affect performance and challenge seeking through the mediating variables of attribution[1], performance-avoidance vs. learning/mastery goals[2], and effort beliefs[3] (Dweck and Yeager, 2019). Furthermore, according to research on mindsets and self-regulation, it is also goal monitoring, and not only goal setting and goal operating, that mediates the effects of mindset on goal achievement. A fixed mindset predicts a tendency to experience negative emotions during the goal-monitoring process, as well as low expectations of future success. Such people are more likely to regard anything less than complete goal achievement as evidence of a lack of ability, and these helpless-oriented negative emotions then undermine successful achievement (Burnette et al., 2013). Thus, GMP does not target only malleability beliefs but also the different attributive styles and self-regulation processes associated with them.

According to our definition, GMP in basic education (Rissanen et al., 2019) reflects process-focused pedagogical thinking and teachers' process- (rather than trait-) focused interpretations of the learning, behavior, and achievement of students. It is associated with the teacher's own growth mindset and is likely to foster growth mindsets in students. We identified four educational principles as core factors of GMP. The first is to *support individual learning processes*. Instead of making quick and stereotypical interpretations of students and their qualities,

[1]*Attribution* refers to a process by which persons make judgements about the causes of failure or success. Successes and failures can be attributed to e.g. innate abilities or process factors.

[2]Having *performance-avoidance goals* means that the person is mainly concerned about avoiding performing poorly, whereas people with *learning/mastery goals* focus on the process of mastering the skill or knowledge and prioritize learning over performance. These ways of goal setting are related to responses to setbacks: *helpless-oriented* persons give up in front of failures, but *mastery-oriented* seize challenges and become eager in front of failure and see challenges as learning opportunities.

[3]*Effort beliefs* are about seeing effort as a positive thing that helps to grow abilities. People with high effort beliefs regard effort as necessary part of learning, whereas people with low effort beliefs consider high effort as indicator of low ability.

teachers should take time to determine the learning barriers of individual students and attribute their success and failures to process factors rather than fixed qualities. In particular, teachers should understand how students' fixed mindsets may impact self-regulation and manifest as "fixed mindset behavior," for example, as emotional reactions and helpless-behavior (Burnette et al., 2013). Thus, teaching based on individualized support and differentiation is a crucial starting point for promoting GMP in basic education.

The second principle is to *promote mastery orientation* by focusing on mastery rather than performance goals (defining success in terms of learning and improvement rather than demonstrating competence and excelling over others). Mastery orientation is also associated with challenge-seeking (Lee and Kim, 2014) and supported by placing emphasis on formative assessment and peer support. The third principle of GMP is *persistence*. Teachers with fixed mindsets tend to console students and to give up on them more easily (Rattan et al., 2012; Rissanen et al., 2018a; Rissanen et al., 2018b), whereas those with growth mindset are more persistent: they provide honest feedback and assist their students to overcome their helplessness. In this, the teacher's own growth mindset becomes increasingly relevant. Persistence demands a genuine belief in the ability of students to learn and overcome the difficulties they may currently be experiencing. However, it is not enough merely to emphasize effort: students should be taught a variety of strategies for overcome "learning pits" (Boaler, 2019). GMP addresses the importance of helping students examine and change their inner speech in the face of setbacks. Moreover, they should be provided with honest but encouraging feedback in the form of "not yet" (Ronkainen et al., 2019).

The fourth GMP principle is to support *process-focused thinking in students* by purposefully fostering their belief in the malleability of the brain and situational attributions, stressing the importance of effort as well as the positive role of challenges, mistakes, and failures in learning, offering process feedback, as well as emphasizing strategies and learning-to-learn goals. These aspects – particularly the first two – are typically at the core of mindset interventions. In our model, however, they constitute the last principle, as relying on mindset messages without persistently offering individualized support would risk turning to "false growth mindset pedagogy."

A growth mindset is often understood as a positive psychological construct (e.g., Chan et al., 2020). Positive pedagogy draws on aspects of positive psychology and attaches importance to processes that define wellness, as well as the identification and nurturing of students' character strengths (see, e.g., Chan et al., 2020; Gilman et al., 2014; Seligman, 2002). GMP aligns with many aspects of positive pedagogy, such as a focus on the holistic well-being of students and optimism. However, in our view, the GMP approach differs somewhat from the main tenets of positive pedagogy. For example, promoting student motivation by helping them become aware of their abilities and strengths as well as avoiding tasks that are overly challenging and that may trigger negative emotions (see, e.g., Ranta et al., 2020), clearly differ in focus from GMP practices. GMP is based on the idea that persistence in the face of long-lasting problems and difficult setbacks is better promoted through learning to see difficulties as a normal part of learning and by strengthening malleability beliefs.

Furthermore, critics voice concerns that an emphasis on personal growth could reinforce and legitimize the influence of neoliberalist educational ideals (Adams et al., 2019; Chan et al., 2020), such as the pursuit of increased efficiency and individuals' responsibility to "fix themselves," as opposed to developing educational and societal systems in which individuals can thrive (see, e.g., Kohn, 2015; Webster & Rivers, 2019). In our view, supporting a belief in the human potential to change and learn does not imply succumbing to the pressures of continuous self-maximization and self-cultivation. GMP can have the potential both to bring peace to the human condition of incompleteness, and, instead of seeking motivation from ego-boosting experiences of success and achievement, to help allay ego-related concerns when they disturb learning.

THE FINNISH CONTEXT

This study was conducted in the context of Finnish basic education – more specifically, elementary-school (grades 1–6). At this level, students are aged between seven and 13, the teaching is uniform for all, and it is generally conducted by a class teacher. Finnish class teachers, the subjects of this research, are highly educated, with a Master's degree in education (Tirri, 2014). Moreover, teacher education in Finland is research-based (Tirri, 2014; Eklund, 2014) and student teachers are educated to become researchers of their own work. During their studies, they also attend teaching practicums organized in the university's *teacher training school*. As a result, Finnish teachers are valued and trusted professionals, and teacher autonomy is also high.

As in other Nordic countries, equality and inclusiveness are central values in Finnish educational policy (Arnesen et al., 2007; Takala et al., 2009). One of the main educational principles aimed at maintaining equality is the requirement to take care of the weakest students (Tirri and Kuusisto, 2013); consequently, the strongest support is directed to those with special educational needs (Niemi, 2012). Thus, more emphasis has been placed on equality in terms of educational outcomes than on the pursuit of individual excellence (Hotulainen and Schofield, 2003). Nevertheless, since the 1990s, there has been an ever greater focus on individuality and freedom of choice, with the importance of taking every student's needs and abilities into account acknowledged in both the Finnish Constitution (731/1999) and the Basic Education Act (628/1998).

Finland's success in the Program for International Student Assessment (PISA) was notable at the beginning of the 21st century (OECD, 2004, 2011). However, PISA results since 2013 have revealed a decline in the achievements of Finnish students (Kupari et al., 2013; Leino et al., 2019). One suggested explanation for this trend is the current lack of willingness in Finnish schools to confront situations and deal with content that may be challenging or disquieting for students (Hautamäki et al., 2015). Fear of failure among Finnish students is less than the

OECD average. However, the difference between girls and boys is notable, with girls being more anxious about failure than boys (Leino et al., 2019).

Many features of the Finnish educational system align with GMP principles (Rissanen et al., 2019). The National Core Curriculum for Basic Education (Finnish National Board of Education, 2014) advocates pedagogy that meets the needs of diverse learners in inclusive settings. Accordingly, differentiated teaching is emphasized as the pedagogical basis for education. Furthermore, curriculum contents that reflect GMP principles include formative assessment, student goal-setting and self-assessment, progress assessment, the use of different learning strategies, and encouraging constructive feedback. However, aspects previously identified among Finnish teachers that run counter to the principles of GMP include trait-focused as opposed to process-focused pedagogical thinking and practices in the case of academically competent students.

Most Finnish teachers nevertheless have growth mindsets regarding student intelligence and giftedness (Laine et al., 2016, Laine et al., 2016; Ronkainen et al., 2019). However, some Finnish teachers continue to hold fixed mindsets, and such teachers are more likely to concentrate on performance-oriented strategies. Finnish students (aged from 9 to 19) also tend to have growth mindsets. Nonetheless, they perceive intelligence as more malleable than giftedness, and younger pupils (age 9–12 years) hold more fixed views about intelligence (Kuusisto et al., 2017b). There is thus a need to reinforce the development of a growth mindset in this age group.

Five class teachers from a Finnish teacher training school, all of whom also supervised teaching practicum of student teachers in their classrooms, participated in the study. These individuals were suitable subjects for this study for several reasons. First, as teachers at a university teacher training school they are required to continuously update their research-based pedagogical knowledge and are able to analyze the added value of GMP against the state-of-the-art pedagogical knowledge they already possess. Moreover, even though research has been conducted on the mindsets of students and teachers in Finland for some time, it seems that Finnish teachers remain relatively unfamiliar with the concept: at least it was unfamiliar to all the teachers involved in this study, which means that they had not developed "false growth mindset" practices either.

DATA AND METHODS

The present study is part of the research project CoPErNicus – Changing Mindsets about Learning: Connecting Psychological, Educational and Neuroscientific Evidence, the aim of which is to investigate the views of students, teachers, and parents on learning. The project utilizes a multidisciplinary approach based on psychological, educational, and neuroscientific data. For the present study, we collaborated with Finnish class teachers (n = 5) and explored how they adopted, implemented, and evaluated GMP. Our research questions were the following: 1) How do teachers evaluate the impact of GMP on their pedagogical thinking and practice? 2) What kind of differences exist between the evaluations of growth mindset and fixed mindset teachers? Previous studies have explored differences in the pedagogical practice of teachers with different mindsets, but this study was designed to investigate how growth mindset and fixed mindset teachers react to GMP training and what kind of changes in their pedagogical thinking and practice they report.[4]

In order to be able to induce and explore teachers' learning processes in natural settings, we regarded teachers' active participation in the research process necessary. Our methodology draws on participatory approaches and includes many typical aspects of design-based research (DBR): the emphasis was on theory building and its practical validation, the study was situated in a real educational context, and focused on the design and testing of an intervention (see, e.g., Anderson and Shattuck, 2012; Plomp, 2007). However, participation was more limited than in many DBR approaches – the teachers did not participate in the analysis and reporting phase of the study. The extent of teachers' participation in the research was determined partly by the time resources they could allocate for this project. Moreover, the term "intervention" has a double meaning here. This is because the five teachers involved in this study implemented a growth-mindset intervention for their students developed for grade levels 3–6 within the CoPErNicus project, while they were themselves the target of an intervention. This included 1) education about GMP and growth-mindset interventions, 2) the implementation of GMP by the teachers in their everyday work, 3) the implementation of a growth-mindset intervention by the teachers in their classrooms, and 4) guided self-reflection among the teachers. The influence of the student intervention was measured quantitatively (see below), while our approach in this article is qualitative and our focus is the way teachers implement GMP.

We assessed the mindsets of the five teachers of this study at the beginning of the research period (before the teachers received any training) using Dweck's (2000) Implicit Theories of Intelligence Scale, which is a six-point Likert-type scale (1–3 indicating entity beliefs/a fixed mindset, and 4–6 indicating incremental beliefs/a growth mindset, e.g., *Your intelligence is something about you that you can't change very much*). Three of the teachers (GM1 M = 5.0; GM2 M = 5.0; GM3 M = 5.75) displayed growth-mindset tendencies, whereas the mindsets of the other two (FM1 M = 3.0; FM2 M = 2.25) were more fixed. These measurements aligned with our interpretations based on the interviews and diaries, which enabled us to analyze the possible impact of the teachers' own mindsets on implementing GMP. At the time, four (GM1, GM3, FM1 and FM2) taught classes in grade 3, and one (GM2) in grade 5. GM1 and FM2 co-taught a class. FM1 was male, while the others were female. Their teaching experience ranged from 8 to 10 years (GM1, GM3 and FM2) to approximately 20 years (FM1 and GM2). The teacher training school in which the teachers worked

[4]The language we use (FM teachers/GM teachers) may suggest a view of mindset as a fixed trait. We use these terms to ensure readability of text; however, they should be understood as referring to teachers who at the moment and in the context of the study express a stronger tendency towards either growth or fixed mindset.

TABLE 1 | An overview of the lessons, topics and methods of the GMP intervention program.

Lesson	Topics addressed	Methods used
1. Introductory lesson	The general structure and topics of the lessons	Instruction for using learning diaries for self-reflection during the program. Learning the basic *theme rhyme* of the intervention program. The rhyme was repeated in every following lesson, with additional and more challenging movements added each time, the purpose being to demonstrate learning processes and the effects of "training the brain."
2. The brain is like a muscle	The basic structure of the brain and the roles of different parts of it. The role of the limbic system and the cortex in learning. The neuroplasticity of the brain and neural processes of learning	Bringing examples of students' own learning throughout their childhood to demonstrate the extensiveness of what their brains have already learned. Using the *fist to model the brain,* with the wrist as the stem, the thumb as the limbic system and the fingers as the cortex. Referring to the limbic system as a "lizard" that evokes emotions and becomes alarmed when a possible threat is perceived, and how this can disturb learning processes. Discussing different strategies to take responsibility of one's emotional reactions and "calm down the lizard."[5] Explaining the creation and reinforcement of neural connections during learning
3. Challenges in learning	The importance of challenges for learning. The learning pit and how to come out of it	Discussing challenging learning situations and the accompanying emotions. Reflecting on students' own experiences of and emotions during challenging learning situations through the metaphor of *the learning pit* (Boaler, 2019). Reflecting on strategies for getting out of the learning pit
4. Mistakes are part of learning	The important role of mistakes in the learning process. Growth mindset as a concept	Listening to and reflecting on a children's story about learning from mistakes. Discussing the meaning of mistakes and their important role in learning. Presenting the concept of a growth mindset. Reflecting on one's own reactions to mistakes and challenges and reframing their meaning in the context of learning.
5. Internal speech	Growth-mindset speech	Practicing noticing "fixed mindset messages" in one's internal speech and learning to change them into "growth mindset messages" (Thomaes et al., 2020) through pair discussion and drama. Students were introduced to growth-oriented inner speech with examples such as "I don't know it yet," "It feels hard now, but I can learn it" or "Everyone makes mistakes; it is a normal part of learning."
6. Summative lesson	Revisiting the topics of previous lessons	Revisiting all the topics addressed thus far and discussing their key contents. Reflecting on the processes of learning the theme rhyme and the accompanying challenging movements.

was an urban school that had students from different SES backgrounds.

Contrary to some DBM studies (Anderson and Shattuck, 2012), the teachers did not participate in designing the study approach and research questions, which were designed on the basis of our previous studies. However, the teachers were involved in designing the interventions. First, they attended a one-day training event about GMP (November 2019), where teachers were educated about the growth-mindset meaning system, its implications for learning and motivation as well as the principles of GMP. Through a "learning café" method they began to develop concrete ideas for implementing GMP in their own teaching. During a second training day in January 2020, the teachers learned about the growth-mindset intervention that was designed within the CoPErNicus research group, and the materials were revised based on their feedback. The five teachers participating in this study implemented an intervention titled "I will learn!" over 3 weeks in February 2020. This GMP intervention program included six lesson plans, which are briefly presented in **Table 1**. The general purpose in the lessons was to cover different aspects of the growth-mindset meaning system. The intervention was developed utilizing previous mindset interventions and the relevant mindset literature (e.g., Aronson et al., 2002; Dweck, 2006; Blackwell et al., 2007; Boaler, 2019). It was designed to support malleability beliefs, effort beliefs, situational attributions, coping with mistakes and challenges, and mastery orientation through developing self-reflection. The content and material were created to be suitable and effective for elementary school children within six 45-min lessons. The key teaching content included the malleability of the brain and neural processes of learning, normalizing challenges in learning, and learning new ways of overcoming difficulties. The students were encouraged to reflect on these things on a personal level throughout the intervention *via* learning diaries.

We also measured the influence of the intervention on the students quantitatively. However, given the lack of a specific experimental design for this part of our study, the quantitative results serve merely as background information and support for the qualitative observations. Eighty-five third-grade ($n = 61$) and fifth-grade ($n = 24$) students completed an online questionnaire before the intervention and 4 weeks after its completion. The general-intelligence mindset of the students was measured on four items based on entity theory taken from the Implicit

TABLE 2 | Reflection instructions.

Guidelines for reflections during the student intervention	Guidelines for reflections on implementing GMP
After each intervention lesson, reflect on and write about your observations. Use the following questions to support your reflective process: • What do you think worked well in the lesson? What induced challenges or confusion? • What reactions did students have to the content and methods of the lesson? • How could the lesson be further improved? • What should a teacher consider when planning and conducting the lessons?	Report on your experiences of and reflections on situations, in which you • Observed students expressing fixed or growth mindsets • Noticed that your own fixed or growth beliefs influenced your pedagogical practice and interaction • Consciously tried to act according to the principles of GMP • Noticed changes in students' motivation, behavior or learning that you interpreted as being linked to the intervention and/or the implementation of GMP in the classroom

Theories of Intelligence Scale (Dweck, 2000). In turn, we measured effort beliefs using five negative statements (e.g., "It doesn't matter how hard you work – if you're not smart, you won't do well.") from the questionnaire used by Blackwell (2002). The students indicated how much they agreed with each statement in the questionnaire by marking one of six circles that varied in size and ranged from "not at all" to "really a lot"; the answers were then mapped on a six-point Likert-type scale. Higher scores on the scales indicated a stronger endorsement of a growth mindset and a weaker endorsement of negative effort beliefs. The internal consistencies of the instruments were acceptable (Cronbach's alphas from 0.73 to 0.91). A paired-samples t-test revealed statistically significant differences in the scores related to a general intelligence mindset before (M = 3.43, SD = 1.38) and after (M = 4.09, SD = 1.47) the intervention program: t (84) = −5.81, $p < 0.001$. Similarly, statistically significant differences were also found between the pre-intervention (M = 3.96, SD = 1.00) and post-intervention (M = 4.16, SD = 1.11) scores for negative effort beliefs: t (84) = -2.36, p = 0.02. These results indicate that the intervention affected the students' general intelligence mindset and negative effort beliefs in the predicted direction. No statistically significant differences between the student groups of different teachers were found.

The data of this study includes diaries kept by teachers and teacher interviews. The teachers wrote a diary about their experiences during the student intervention in February 2020, which they sent to the research group either after every intervention session or in the middle of and after the intervention period. The original plan was also for them to write a diary about the implementation of GMP during the spring of 2020. However, following the introduction of distance teaching due to the COVID 19 pandemic, the teachers' workload exceeded and less time-consuming data collection needed to be planned. In order to accommodate this change in teachers' workload, we decided to withdraw the diary task and conducted semi-structured interviews with the teachers *via* video link in April 2020. Each teacher was interviewed once. The interviews lasted approximately 30 min, and they were recorded and transcribed. GM1 and FM2 had nevertheless written GMP diaries, which we used as data in addition to the interviews as well as intervention diaries written by all teachers. **Table 2** lists the instructions for teachers in their reflections on the student intervention and on implementing GMP. In addition to covering these reflection guidelines, in the interviews teachers were asked to evaluate possible changes to their pedagogical thinking and practice during and after the intervention period as well as their perceptions of the impact and significance of GMP.

The data (diaries and interview transcripts) were analyzed by means of abductive qualitative content analysis (Timmermans and Tavory, 2012; see also; Elo and Kyngäs, 2007). The units of analysis were sentences or paragraphs in the transcribed teacher interviews and diaries that provided answers to the first research question, i.e., teachers' evaluations of the impact of GMP on their pedagogical thinking and practice. These were formed into condensed meaning units. The CMUs were then inductively coded (but guided by the researchers' knowledge of growth mindset theory). In the next phase, these codes were deductively categorized under the four principles of GMP in an iterative process whereby small revisions were made to the coding. The second research question was analyzed by marking which teachers' CMUs were included under each category and then interpreting the differences that emerged between the FM and GM teachers, category by category. The CMU's of each individual teacher were listed and short profiles written; however, the space here allows only presenting key observations from these profiles. **Table 3** presents the categories linked to GMP principles and teachers as well as sample excerpts from the CMUs. Codes per category are presented in **Supplementary Appendix Table S1**.

RESULTS

Self-Reported Impact of GMP on FM and GM Teachers' Pedagogical Thinking and Practices

Recognizing and Supporting Students' Individual Learning Processes

The growth mindset teachers in this study reflected on new ways of interpreting students' learning and behavior. Their reading of reluctance among students to put in effort and to take on challenges had changed as they had learned to *recognize and overcome fixed mindset behavior* (**Table 3**) – for example, helpless-responses, freezing, and strong emotional reactions to

TABLE 3 | Teachers' perceptions of the impact of GMP on their pedagogical thinking and practice.

GMP dimensions[6] Rissanen et al. (2019)	Impact of GMP on teachers' pedagogical thinking and practice number of CMUs	FM1	FM2	GM1	GM2	GM3	Sample excerpts from condensed meaning units (CMUs)
Recognizing and supporting students' individual learning processes	A) Recognizing and overcoming fixed mindset behavior (25 CMUs)	—	—	x	x	x	GM1_fixed mindset shows as students' tendency only to take on easy tasks which they are sure they will manage GM2_has started to think how important it is that a teacher understands the many possible reasons behind a student's tendency to give up and get stuck GM3_recognising how a student with a fixed mindset compares himself to others, considers himself dumb, and cannot handle making mistakes
	B) More versatile attributions (14 CMUs)	—	x	x	x	x	GM1_has learned to recognize many new possible reasons for why a student is not able to start working on a task GM2_has begun to pay more attention to the impact of students' emotional processes for learning GM3_has began to put more effort into analysing students' learning processes FM2_has began to pay more attention to students' physiological states
Promoting mastery orientation	C) Encouraging challenge-seeking and providing adequate challenges (10 CMUs)	—	x	x	—	x	GM1_wants to start giving high achieving students more challenging tasks GM3_wants to put more effort into setting concrete learning aims also with special needs students FM2_has started to tell students when they succeed easily, that it would be good to find more challenging things so that they can really learn something
	D) Avoiding comparison and emphasizing collaboration (4 CMUs)	—	—	—	—	x	GM3_puts more emphasis on developing students' skills to encourage each other
Persistence	E) Persistence through positive messages and encouragement (13 CMUs)	x	x	—	—	—	FM1_more effort to positively encourage students to strive FM1_used to confront students more but now wants to encounter challenges in a more positive manner FM2_wants to emphasize to students that they can and will learn
	F) Persistence through emotion regulation supported by normalization of hardship in learning (32 CMUs)	—	x	x	x	x	GM1_personally significant realization has been to understand the "learning pits" and normalize them for students GM2_the language of overcoming difficulties has took root in her pedagogical interaction GM3_has received support for her idea that learning does not need to be easy and fun all the time FM2_wants to teach her students how to endure a certain amount of discomfort in learning
Fostering students' process focused thinking	G) Teaching about the brain and the significance of "brain exercise" for learning (9 CMUs)	—	—	x	x	x	GM1_emphasises that exercising the brain is necessary for learning GM3_more "brain talk" in the classroom GM2_reminds students of the intervention and what happens in the brain during learning, when notices that a student is giving up

(Continued on following page)

TABLE 3 | (*Continued*) Teachers' perceptions of the impact of GMP on their pedagogical thinking and practice.

GMP dimensions[6] Rissanen et al. (2019)	Impact of GMP on teachers' pedagogical thinking and practice number of CMUs	FM1	FM2	GM1	GM2	GM3	Sample excerpts from condensed meaning units (CMUs)
	H) More process feedback (11 CMUs)	—	x	x	x	x	GM1_has sent students' parents instructions on how to support their children with process feedback GM2_when students succeed has started to focus the feedback on how they have practiced GM3_particularly with high achieving students has began to try to shift their attention away from talent and intelligence to process factors FM2_has learned to avoid "praising a person" and support growth instead
	I) Helping students to strengthen situational attributions through self-reflection (40 CMUs)	—	x	x	x	x	GM1_increasingly guides students to observe, recognize and verbalize the factors that influence their learning processes GM2_has developed the habit of asking students to reflect on and talk to the teacher about their current state of mind and how it may influence their learning GM3_her students have started to refer to their lizard being active FM2_in P.E. lessons there are good opportunities to reflect what emotions arise when trying something new and how that influences performance

difficulties in learning–resulting in new ways of approaching these situations:

> GM1: Getting nervous, that is what very easily shows how "the lizard takes over." It is important how you see it now in a different way. . . . these moments of freezing and getting stuck, you learn to see them and see how they may appear in so many different ways in different students.
>
> GM2: Really this has awoken me. . . . I was aware of a lot of it before, but now I really started to reflect on how important it is for the teacher to recognize how students freeze, sometimes there are these pits and moments of getting stuck and giving up, like what might lie behind this behavior. . . . much of this was totally new to me and I think this is something every teacher should be aware of. . . . With growth-mindset thinking I have learned how to approach these specific students. Giving up is so common these days.

By contrast, teachers with a fixed mindset failed to report similar changes. However, FM2 as well as all the GM teachers also reported developing *more versatile attributions* (**Table 3**) for students' learning and behavior: in particular, a sharper focus on the brain as the organ of learning had increased their likeliness of attributing students' successes and failures to the physical prerequisites of learning – for example, eating, sleeping, and exercising. The malleability beliefs of FM2 seemed to have changed somewhat, and she reported an increased belief in students' ability to learn. The following quote demonstrates her evolving growth mindset and how it aligns with attributing the possibility to learn to suitable strategies:

> FM2: This thought about the malleability of the brain, and then to have the idea that each and every one of us is able to advance in our own zone of proximal development. . . . Like more than before I think that everyone can learn if we just find the right strategies and paths for development, and, maybe through recognizing our strengths and the skill levels at the moment, we can advance further. It's like a consolidating idea, everyone is able to grow. Not everyone has the same capacities, and they don't need to have, but we support children's learning on their own levels and in their own states of development.

Promoting Mastery Orientation

Some aspects of GMP related to the promotion of mastery orientation (e.g., an emphasis on formative assessment) are already deeply integrated into the Finnish mainstream pedagogical thinking and thus provoked little reflection or change among the teachers of this study. Nevertheless, the teachers reported some increase in *encouraging challenge-seeking and providing adequate challenges* (**Table 3**), which were categorized under this principle since teachers referred

[6]See section "Growth mindset pedagogy" in this article.

to the importance of adequate challenges as a way to maintain the focus on learning rather than on achievement or performance. However, a difference between the teachers that seemingly reflects their different mindsets was that FM2 referred mainly to "clever students" when discussing the importance of challenges, indicating her continuing trait-focus, while the GM teachers also considered challenges important either for all students or particularly for those with difficulties:

> FM2: the clever ones did embrace this idea very soon. . . . and were able to reflect on this in the assignments, that we want to improve and we want challenges. . . . I think those students who need challenges, with them this idea of developing oneself stayed.
>
> GM3: I have had this idea already before that I don't have to make things too easy for the special support students, but I can challenge them. . . . But now [with] this growth mindset thinking I have made this clearer for both myself and the students.

This finding aligns with previous results on the tendency of FM teachers to implement process-focused pedagogy for high achievers (as they believe these students have potential that can be cultivated), and GM teachers for low-achievers (because they view these students as underachievers whose potential needs to be unleashed) (Rissanen et al., 2018a; Rissanen et al., 2018b). However, process-focused pedagogy is equally important for all students – also high achievers (Rissanen et al., 2019).

Peer feedback is known to prime and modify mindsets and academic motivation (Zhang et al., 2020), and peer feedback was practiced in the intervention of this study through drama (see **Table 1**). However, only one teacher (GM3) discussed putting greater effort into developing peer relations by *avoiding comparison and emphasizing collaboration* (**Table 3**). This teacher reported improvement in the students' ability to encourage one another:

> GM3: So my students have had very lovely moments, like "if you don't know how to do this YET, let me help you." This is not totally new, but I feel there have been more of these moments this spring, so maybe (GMP has been able) to harness peers to support those who have a low understanding of themselves as learners.

In general, this teacher with the strongest growth mindset also reported the widest application of GMP.

Persistence

There was a clear and interesting difference between the GM and FM teachers in the way they interpreted and implemented support for persistence. The FM teachers emphasized *persistence through positive messages and encouragement* (**Table 3**). For FM1, the language of positive encouragement for effort and persistence was the one thing that he mentioned as an influence of GMP:

> FM1: I think we (he and his class) have absorbed new vocabulary and language and a kind of common language; like we talk about trying and pushing and encouragement and cheering, like hey, when you just keep on making an effort, you will learn.

However, this kind of extensive emphasis on effort, which reflects a lack of effort in analyzing and overcoming individual barriers to learning, was almost completely absent from the GM teachers' reflections. Instead, they discussed developing *persistence through emotion regulation supported by normalization of hardship in learning* (**Table 3**). Moreover, they felt the need to address difficulties in learning more openly and straightforwardly than is typical in positive pedagogy (which had been strongly implemented in their school, and the teachers had recently been educated about it) and reported that GMP had provided them with the necessary tools. According to the GM teachers, it was perhaps more important to recognize and address individual learning barriers before pushing for more effort. In particular, they mentioned paying attention to emotion regulation and verbalizing emotional learning processes for students – as well as for themselves. "The lizard" (see **Table 1**) had been experienced as a particularly useful tool in this:

> GM1: One student had difficulties getting any text on paper in one lesson. I, "the great pedagogue," go and grill this kid to get the work started. As a teacher, I get so irritated when it seems like the student is not even trying. Luckily, I then recognized my own emotional state and start talking to myself – calm the lizard down! Suddenly, I realize that the student's lizard is also active, but that it shows in a different way – he freezes. After realizing this, I understood that I have to help this kid to calm down. I started talking with him calmly, and little by little he relaxed, and could take my advice. . . . Situations such as these have been very difficult for me, too, I have got stuck as well and just started like, we just need to do this, we need to work, like try, try, try.

For GM2, an important part of supporting persistence by normalizing hardship was to increase students' awareness of the prevalence of being in the "learning pit" (see **Table 1**):

> GM2: I developed the habit of asking, "how many of you have been in this kind of situation?" Like in arts class when somebody experienced failing, and so many hands were raised. . . and how it may happen that you start to compare yourself with others, and feel that I am unable. . . and how to move on from this, so many good ideas for that then came from the students. . . . And the learning pit. . . I think many of the kids have experiences of being there, and then they recognized that "hey," that student has also been there and so many others, too. Probably all of us are there sometimes.

Furthermore, using the phrase "not yet" (see **Table 1**) was regarded as a good tool for normalizing the incompleteness of learning processes and the need for perseverance:

> GM3: For me, maybe the most significant words that I have continued using are "not yet", like. . . we didn't succeed with this yet, but let's try again next time, that phrase suits me very well.
>
> Researcher: How do students react to that?
>
> GM3: I think these words are quite calming. By using them you want to signal to students not to worry, if we did not know how to do this today, we will continue trying tomorrow. Today, this was difficult; we need more practice. Students react to this really well; I think they feel relieved that the teacher was not angry with me if I did not know how to do this.

Altogether, the GM teachers reported that these practices had led to increased persistence and challenge-seeking among certain students. These students had previously tended to "become stuck" easily and abandon their attempts before even trying, but they had now become more courageous. Moreover, they observed increased calm and a more relaxed orientation among students who were described as having problems with emotion regulation or low self-confidence. According to the teachers, this was attributable to their improved ability to reflect on and regulate their emotional learning processes by normalizing difficulties, which led also to a reduction in competitiveness among students.

Fostering Students' Process-Focused Thinking

GM teachers discussed *teaching about the brain and the significance of the "brain exercise" for learning* (**Table 3**) as one GMP practice that had remained with them and through which they attempted to maintain students' process focus. Furthermore, both they and FM2 reported paying attention to their methods of providing feedback and increasing the focus on *process feedback* (**Table 3**). The GM teachers offered rather deep reflections on verbalizing students' learning processes in order to strengthen their malleability beliefs and process focus and overcome fixed mindset behavior, as demonstrated by GM3's description of one student case:

> GM3: Particularly when he compares himself to others and considers himself dumb, and even the smallest mistake throws him off, his lizard goes wild. . . in these moments, just last week we had several good moments, when he's had a very negative first reaction, when we get over that and manage to start working and learning something new, so afterwards verbalizing that to him. But often we do it, like, the student sits at his desk and draws and we adults in the classroom talk when he is there and can hear us, like "it was super great what happened today; like first it was very difficult and he was reluctant but when we persistently worked and tried and tried again, how well things got going, like how could we support this in the future, too." Like, without making it too big a deal, making the student aware that he had got over his emotional reaction, and even though he thought at first that he was not going to learn anything, he did learn. This emotional reaction is so strong; we have to deal with that first. So, this student is one of my "I will learn" students, whom I have really designated with an exclamation mark in my mind and with whom I have made the most progress in implementing these things since the intervention.

Furthermore, all teachers except FM1 discussed *helping students to strengthen situational attributions through self-reflection* (**Table 3**) – for instance, by attempting to include moments of reflection on their current state of mind and other current situational factors in their daily practices. The teachers considered these practices successful: students had begun to seek situational instead of trait attributions, which had also led them to develop new ways of overcoming difficulties:

> GM2: Just today, one boy told me, when he got a bit frustrated during the exam, that actually, I didn't sleep that well last night. . . . And another girl, who has diabetes, when she had difficulties, she started to think that her sugar levels might be low. . . the kids have started to process these things themselves. So, they don't blame themselves so easily for being dumb; they might think that maybe there are also some other. . . some outside factors that may explain why you don't succeed with a task or you don't understand. . . . And when we are in the "learning pit", the kids. . . the students remember that now you can ask for help and maybe someone can help you to go further. These kinds of things, it was interesting to see how they started to apply in practice these things they had learned.

FM2 also reported some changes that were categorized under this GMP principle – such as returning to the idea of the learning pit and the steps for climbing out of it to encourage students' reflection on their learning processes:

> FM2: Well, we have now discussed also in other lessons that could this be about the learning pit now and in what phase we are now and how to cope. Sometimes. . . and using these slogans, like "not yet" . . . But I don't know if it's us or the students who have brought up these things.

However, her inability to provide detailed examples from particular situations or student cases in a similar manner to the GM teachers indicated a more superficial change.

Evaluations of GMP: Summary

Clear differences were found in the way the teachers perceived GMP and its impact on their own professional development. FM1 reported the least changes on a personal level and had not noticed any visible changes in his students either. He saw GMP as an

"easy concept" and considered encouraging student effort as the core of GMP. Emphasis on effort without ensuring individualized support can be regarded as a reflection of a "false growth mindset" (Dweck & Yeager, 2019), and the one-dimensional practices of FM1 could be referred to as implementation of "false GMP." The reactions of his students to GMP had been "cynical" and reluctant. FM2 regarded the ideas of GMP as novel and inspiring; however, she also found them confusing and difficult at times. In comparison to the GM teachers, she relied on a formulaic implementation of GMP and reflected less on implementing its principles creatively and situationally.

The GM teachers were able to develop further the GMP ideas taught to them in the training sessions. They all produced deep reflections on ways to use GMP to support students' emotion regulation. Moreover, they voiced their enthusiasm for GMP and emphasized the difference between it and other pedagogical trends. For instance, while they were familiar with positive pedagogy and saw value in its principles, they regarded GMP's ideas of the normalization of hardship in learning as unique and useful. Notably, GMP offered them tools for working particularly with students whom they had learned to identify as suffering from motivational and emotional problems related to a fixed mindset. Departing from false GMP practices, a key idea for them was to deal with emotional barriers to learning through GMP practices before pushing for more effort.

DISCUSSION

Limitations and Validity of the Study

There are limits to the conclusions that can be drawn from the self-reported case data of this study. Our findings should be regarded as preliminary evidence that can hopefully spur more research in different contexts and with approaches that allow larger samples. Making inferences about individual teachers' mindsets based on their survey responses is seldom, in itself, a reliable approach; however, our collaboration and interviews with the teachers allowed us also to evaluate their mindsets qualitatively, with the resulting conclusion that their answers to the mindset scales reflected their real-life mindsets rather well. By studying a group of highly educated and experienced teachers, it was possible to draw inferences about the impact of the teachers' mindsets on their adoption of GMP; however, the specific nature of this group limits the possibilities of generalizing the results to other kinds of teacher groups.

The validity of design-based research is based on the ability of researchers to walk the narrow line between committed enthusiasm and detached objectivity (Anderson and Shattuck, 2012). In this study, we unreservedly fostered enthusiasm and trusted that such enthusiasm would motivate the teachers for only a certain period of time, after which we would be able to identify differences between them. We have included many examples from the data to help the reader evaluate the validity of our interpretations. A critical evaluation of GMP from the experienced teachers in our study would have been valuable. However, possibly due to group dynamics in the highly enthusiastic group dominated by GM teachers, we were unable to provoke much critical reflection. Nevertheless, we would like to emphasize that the evaluation of GMP requires different perspectives, methodological approaches, and datasets, of which the analysis of teachers' self-reported experience reported here is only one. In the CoPErNicus project, we additionally investigate the effects of the growth mindset intervention on elementary school students by using data from surveys, learning diaries, and psychophysiological recordings in order to achieve a multifaceted and all-round understanding of the potential impact of growth mindset pedagogy.

Discussion of the Key Results and Their Implications

Our study aimed to explore the varieties and nuances of teachers' understanding and implementation of GMP in the real-life setting of the Finnish basic-education classroom and to analyze how teachers' mindsets may influence their adoption and implementation of GMP. Our findings contribute to deconstructing the idea of growth mindset as a "simple concept" and provide more evidence of the significance of teachers' mindsets. We found significant differences between fixed mindset and growth mindset teachers in the ways they internalized and applied key principles of GMP. Our previous studies have identified some tendencies similar to those observed in the present study, such as the propensity of GM teachers to practice GMP mostly for low achievers and the inclination of FM teachers to practice GMP for high achievers (Rissanen et al., 2018a; Rissanen et al., 2018b; Author et al., 2019), thus indicating the need to teach GMP for both FM and GM teachers.

These mindset-related differences can be regarded as rather logical. People are motivated to defend their implicit meaning systems, seeking evidence that supports them (e.g., FM teachers attributing the failure of high achievers to process factors but viewing the failure of low-achievers a result of innate traits) so as to preserve their sense of causal certainty. A violated implicit theory engenders anxiety, and thus it is natural to turn away from things that are likely to violate one's core beliefs, even though they might have many positive implications (Plaks et al., 2005; Plaks et al., 2009). In our data, "turning away" aptly describes the response of FM1 to GMP. By contrast, the GM teachers' core beliefs were not challenged; moreover, GMP influences which promoted the development of the teachers' meaning systems into even more coherent and logical entities were welcomed with ease and enthusiasm.

In turn, the efforts of FM1 (and to some extent FM2) to adopt GMP seemed to result mainly in pedagogical practices that induced "false growth mindsets" (Dweck and Yeager, 2019; Zhang et al., 2020), for instance, praising and encouraging effort without ensuring individualized support, whereas colleagues with a growth mindset emphasized the analysis of individual (often emotional) barriers to learning. These observations have implications for teacher education: influencing teachers' malleability beliefs (i.e., mindsets) is a prerequisite for teaching about GMP if the unwanted result of a more superficial understanding of mindsets – practices of "false growth mindset pedagogy" – is to be avoided. Training teachers to implement GMP was part of the design of this study, but the training

was not focused on changing teachers' mindsets. The results indicate, that if teachers' professional development towards GMP is to be supported, inducing self-reflective processes around their own mindset meaning systems is necessary.

People with a fixed mindset are more likely to consider less-than-perfect goal achievement an indicator of their lack of ability, which easily leads to negative emotions and a helpless response in the learning process (Burnette et al., 2013). This implies that normalizing difficulties and setbacks in learning could help promote process-focused thinking: according to the teachers in this study, this was an aspect of GMP that really made a difference for their students. These findings indicate that there is common ground between GMP and research on social emotional learning (e.g., Osher et al., 2016), which should be further explored. GMP could contribute to this field by further enhancing understanding of the relationship between students' implicit meaning systems and their emotional reactions. Furthermore, the insights of these teachers could be read as indicators of where they think the most significant learning barriers lie in their particular educational context: not in insufficient learning strategies, but in students' emotional states. In general, contextualization is a prerequisite for applying mindset theory and GMP in practice and for developing effective interventions.

We hope this study will maintain and provoke further discussion on possible misunderstandings of growth mindset theory and pedagogy. Our teachers saw the value of GMP in supporting students' well-being more broadly in life (see also King, 2012). Cultivating growth mindsets means cultivating teachers' belief in the ability of their (individual) students to learn, as well as limiting their tendency to judge and stereotype. Thus, we see the cultivation of GMP as the cultivation of teachers' ethical professionalism and their ability to promote active change in the educational system. Consequently, we reject comparisons between GMP and neo-liberal ideals emphasizing the efficiency and accountability of education (see e.g., Adams et al., 2019; Chan et al., 2020); on the contrary, we wish to develop discussion on growth mindsets and GMP that diverges from ideas of self-maximation. Critics are right to highlight the misuse of growth mindset theory in education. However, rather than rejecting the theory, it would be preferable to tackle this problem by increasing the input of researchers in the fields of teaching and teacher education in terms of exploring, developing, and critically analyzing "growth mindset teaching" and its implications. A possible future direction could be to build bridges between mindset theory and critical theories of education by widening the discussion on malleability beliefs from psychological constructs to the culturally and communally formed constituents of ideas of being human that shape educational values and systems and have implications for the development of educational equity.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the subjects of research have consented only for the researchers of this study to see the data. Requests to access the datasets should be directed to **inkeri.rissanen@tuni.fi.**

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

All authors contributed to conception and design of the study. IR conducted teacher intervention and qualitative data gathering. IR and EK performed qualitative data analysis. IP performed quantitative data analysis. SL and IP had main responsibility of the student intervention development. IR wrote the first manuscript draft, all authors contributed to writing sections to manuscript, revised, read and approved the submitted version. KT was responsible of the holistic design of the Copernicus project this study is part of.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2021.753698/full#supplementary-material

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ORIGINAL RESEARCH
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Austrian Elementary School Teachers' Perception of Professional Challenges During Emergency Distance Teaching due to COVID-19

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Schools around the world have transitioned to emergency distance teaching due to the COVID-19 outbreak. In particular, the first lockdown (in early 2020) came unexpectedly for all actors and stakeholders in Austria. School authorities, parents, students and, above all, teachers were faced with considerable challenges. The aim of the present study is to evaluate the perception of Austrian elementary school teachers about distance teaching during the first lockdown. Using two different qualitative data sets from the Inclusive Home Learning (INCL-LEA) study, the following research question was investigated: what are the main challenges that elementary school teachers faced in distance teaching in Austria due to COVID-19? A multimethod qualitative research was carried out to answer the research question, and the data were evaluated using the topic analysis method. The teachers identified five greatest challenges: i) a lack of personal contact with the students; ii) additional workload and more stress, iii) non-existent technical equipment; iv) a lack of digital skills; and v) an inability to offer individual support for students at risk. This study has shown that better policies are needed to avoid these problems. Such solutions not only require the purchase of digital devices, but also the development of pedagogically well-thought-out and planned curricula and the provision of opportunities to improve digital skills. Furthermore, it also showed that sustainable working conditions needed to be created to counter the long-term effects of the heavy workload on teachers. However, the difference between distance teaching in times of the pandemic and regular online teaching also needs to be considered when developing and implementing policies.

Keywords: emergency distance teaching, COVID-19, elementary schools, Austrian elementary teachers, main professional challenges

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1 INTRODUCTION

The COVID-19 pandemic led to numerous challenges for nearly all social areas, including education (Huber and Helm, 2020). Because of the pandemic, the school closures in a total of 188 countries resulted in far-reaching challenges and changes for more than 1.8 billion children (OECD, 2020a). Due to the national COVID-19 regulations, elementary school teachers in Austria were forced to adapt to the circumstances and implement forms of teaching that were rarely or not at all used during regular in-person education insofar. Accordingly, elementary school teachers had to become familiar with those teaching methods that could be put into practice during distance teaching, which can be

characterized as the spatially separated transfer of knowledge and skills (Klieme, 2020). The first closing of the schools from March to May especially posed numerous difficulties for all educational staff.

1.1 Conversion to Distance Teaching

Until March 2020, the typical teaching situation at schools occurred in the form of personal encounters between students and teachers. Students were present in the classrooms and had to actively participate in order to subsequently reproduce knowledge in the context of written or oral assessments (König et al., 2020). During the global outbreak of COVID-19 in early 2020, governments asked educational institutions to shift from familiar, traditional forms of in-person instruction to distance teaching (Rogers and Sabarwal, 2020). In Austria, political actors passed on important information on further procedures only a few days before the school closures. Therefore, elementary school teachers, as well as teachers from other school levels, had very little time to adjust to the unusual situation. During the first phase of school lockdowns, teachers were allowed to exclusively repeat content that the students had already learned. Later, however, the teachers were called upon to teach new subject matter as well (Huber and Helm, 2020).

The abrupt school closures during the COVID-19 pandemic occurred at a time of rapid change in technology (König et al., 2020). This growing technical influence is reflected in all areas of life, not least in the area of education. Today, teachers in many countries around the world educate so-called "digital natives" (Prensky, 2001), for whom new technologies are considered an important part of life (Scherer et al., 2019). Accordingly, current developments suggest that several countries are starting to include digital competencies in their respective curricula (e.g., Siddiq et al., 2016; Flórez et al., 2017). The advantages of using technology in classrooms, such as facilitating learning processes (Shute and Rahimi, 2017), motivating students (Saine, 2012) or preparing youths for the digital requirements of their future career (Preston et al., 2015) have been suggested by several studies. However, the rapid transition to distance teaching has caught many schools unprepared (Helm et al., 2021). Accordingly, recent findings suggest that both technology-aware teachers as well as technology-skill-deficient teachers experienced numerous challenges due to the shift to distance teaching (Kundu and Bej, 2020; Kundu and Bej, 2021). Several studies suggest that tendencies of digitalization may have already advanced large parts of education systems and contributed to improvements in learning processes in higher grades (e.g., Lu and Law, 2012; Edmunds and Hartnett, 2014). Nevertheless, little is known about distance teaching in elementary schools (Hilli, 2018).

Staying at home for several weeks with an uncertain outlook for the future was considered a new and unfamiliar situation for all educational stakeholders (Colao et al., 2020). In order to enable learning processes during such a difficult time, teachers had to quickly find new ways of teaching and acquire or develop the necessary skills (König et al., 2020). When circumstances permitted, some teachers decided to use digital teaching methods in order to maintain learning processes (e.g., Cordes 2020; Huber et al., 2020; Schrammel et al., 2020). However, for a large number of teachers, the implementation of digital teaching formats was a major challenge, especially in the area of elementary schooling (e.g., Hilli, 2018; Kim and Asbury 2020). Accordingly, several studies show that digital forms of instruction were used much less frequently in elementary schools than in other school levels (e.g., Eickelmann and Drossel, 2020; Thies and Klein, 2020). Also, compared to teachers in higher levels, elementary school teachers more often provided students with learning material that parents could pick up at school (e.g., Eickelmann and Drossel, 2020; Schwerzmann and Frenzel 2020). One possible reason for this could be the poorer preparation for distance teaching among elementary school teachers (Eickelmann and Drossel, 2020; forsa, 2020). In addition, elementary school students often do not have the necessary level of media literacy that is required for successful distance teaching (Lorenz et al., 2020). Nevertheless, Kämpf and Winetzhammer (2020) reported that at the beginning of the pandemic, elementary school teachers in Austria also frequently used digital teaching and learning tools such as the reading app Antolin or various learning CDs. In addition, some elementary teachers indicated that adapting learning opportunities to the individual circumstances of students' families was an important issue. For this reason, elementary school teachers opted to use digital learning content voluntarily (Kämpf and Winetzhammer, 2020). After a few weeks of continued school closures all over Austria, however, numerous elementary school teachers decided to extend the use of digital learning formats. Thus, at a later stage of the pandemic and in order to stay in contact with the students in the best possible way, more and more teachers found their way to video platforms such as Zoom or Skype (Kämpf and Winetzhammer, 2020).

1.2 The Burden of Distance Teaching

The decision to become a teacher is often driven by the desire to bring about a change in the lives of young individuals (Anderson et al., 2021). Emotionality, empathy and caring for others are considered central aspects of a teachers' professional identity (Jones and Kessler, 2020). However, these qualities of the teachers' personality and work can involve some risks, since multiple studies have shown that about one-third of teachers were stressed or extremely stressed even before the pandemic (e.g., Unterbrink et al., 2007; Zurlo et al., 2013; Moy et al., 2014; Lambert et al., 2015). The lockdown of the schools and the missing contact with students made it more difficult for teachers to provide adequate support to their students as well as to deal with new types of teaching methods using digital media. It can be assumed that these two factors play an important role in the pandemic-related amplification of teacher strain (Klapproth et al., 2020). The COVID-19 pandemic also contributed to a noticeable sense of insecurity among teachers (Anderson et al., 2021). Both uncertainty about what will happen next and concern about students at risk were cited as the most common stressors in the study conducted by Kim and Asbury (2020).

Several studies suggest that teachers felt rather burdened due to the transition to distance teaching and on average experienced

a medium-to-high amount of stress during the school closures (Huber et al., 2020; Klapproth et al., 2020; Anderson et al., 2021). In addition, those teachers who spent a relatively large amount of time in distance teaching felt even more stressed (Klapproth et al., 2020). However, it became apparent that the proportion of elementary school teachers who taught digitally was rather low compared to teachers from other school levels (e.g., Huber et al., 2020; Helm et al., 2021).

Studies also show that some teachers reported a clearly noticeable increase in their workload during distance teaching as well as in psychosomatic problems (e.g., Klapproth et al., 2020; Prado-Gascó et al., 2020; Tengler et al., 2020; Anderson et al., 2021). The additional expenditure for teachers during the first school closures is also reflected in the diminishing "boundaries" between their work and private life, as reported by the teachers interviewed by Kim and Asbury (2020). This fact should not be overlooked when studying the pandemic-related increasing burden of teachers since, in addition to teaching their students remotely, some had to bear other responsibilities such as taking care of their own children or vulnerable family members (Kim and Asbury, 2020).

1.3 Personal Contact and Social Learning

Functioning teacher-student relationships are critical to the emotional well-being of teachers, especially in the area of elementary schooling (e.g., Hargreaves, 2000; Spilt et al., 2011). In the long run, disruptions in this relationship can lead to a strong psychological strain on teachers (Spilt et al., 2011). Also, the lack of contact with teachers may have grave consequences on students. Accordingly, some study results suggest that, compared to students from higher grades, elementary school students missed their teachers more often during the distance teaching (forsa, 2020; Holtgrewe et al., 2020).

Letzel et al. (2020) reported that a number of teachers stated that they were missing their students during the school lockdown and overall suffered greatly from the lack of contact with the learners. In addition, the results of the study by Anderson et al. (2021) show that, during the period of distance teaching, the teachers interviewed named the missing connection to their students as their main stress factor. During this period, teachers had to stay in close contact with their students in order to maintain students' motivation and follow their learning processes (König et al., 2020). Considering the pandemic-related circumstances and the resulting distance teaching, it becomes apparent that social learning processes in which teachers and students work together on learning tasks were only possible to a limited extent.

Because of the school closures, communication between elementary school teachers and students took place primarily through the parents (Huber et al., 2020; Ferguson et al., 2021; Kundu and Bej, 2021). In some cases, this form of alternative communication led to considerable difficulties. Thus, the teachers' challenge of reaching a large number of students and their associated concern about the interrupted relationships has been outlined in several studies (e.g., Huber et al., 2020; Kim and Asbury, 2020; Porsch and Porsch, 2020). According to Schwab and Lindner (2020b), the teachers interviewed stated that, on average, they could not reach 9.6% of the students at all.

In addition, numerous teachers reported on the importance of parental support in terms of effective distance teaching (Huber et al., 2020; Moss et al., 2020; Kundu and Bej, 2021). Some teachers and school administrators even criticized the parents' lack of digital knowledge, responsibility and support, which further exacerbated the problem of maintaining contact with the students (Huber et al., 2020; Kundu and Bej, 2021). As such, several research works show that teachers found it difficult to establish contact due to the lack of digital skills on the student side (e.g., Stenman and Pettersson, 2020).

Overall, it can be assumed that, following school closure, the educational relationship between students and teachers has been interrupted or at least weakened to a certain extent (Colao et al., 2020), which is otherwise one of the most important sources of enjoyment for teachers (Hargreaves, 2000).

1.4 Teachers' Digital Equipment and Skills

Under normal conditions, teachers must be flexible and imaginative when it comes to the preparation and selection of learning content (Klieme, 2020). Some learning formats that are usually used in in-person teaching were no longer possible due to the new and unfamiliar circumstances of distance teaching. Mixed forms of in-person and distance teaching, such as the use of self-produced explanatory videos for independent familiarization with new learning content, soon became increasingly important (Klieme, 2020.). As more evidence of the many possibilities of digital teaching became available (e.g., Saine, 2012; Preston et al., 2015; Chauhan, 2017; Shute and Rahimi, 2017), elementary school teachers had to become familiar with these teaching techniques and learning methods. However, the use of digital teaching methods was often contraindicated in elementary schools since there was a risk of overtaxing the students (e.g., Huber et al., 2020). Also, young students often did not have technical devices or digital skills required to participate in distance learning (e.g., Helm et al., 2021; Kundu and Bej, 2021).

Digitalization in schools gained significant prominence within the past years (König et al., 2020), but it has experienced a particularly clear upturn as a result of the COVID-19 crisis. During the period of the school closures in early 2020, teachers had to be provided with the appropriate technical equipment such as computers, laptops or cell phones in order to maintain a good quality of distance teaching (Tengler et al., 2020; Wu, 2021). Furthermore, it was considered advantageous if both the teachers and the learners had previous knowledge in the use of information and communication technologies (e.g., Bozkurt et al., 2020; Stenman and Pettersson, 2020; Tengler et al., 2020). As such, this development may have been especially challenging for those teachers who hhave been using traditional pedagogical tools. However, several studies indicate that even young teachers who are considered "digital natives" (Prensky, 2001) often do not possess extensive digital skills (König et al., 2020; Kundu and Bej, 2020, Kundu and Bej, 2021). In accordance with this assumption, numerous findings show that only a small number of teachers had prior knowledge in

digital education (e.g., Tengler et al., 2020; Helm et al., 2021; Wu, 2021).

A recent meta study by Helm et al. (2021), which took into account the results of 97 online surveys with a total of 255,955 participants (students, parents, teachers and school staff) conducted between March 2020 and November 2020, confirms that more than half of the teachers were unprepared or poorly prepared for homeschooling. The findings of the study by Klapproth et al. (2020) suggest that some teachers faced technological problems and therefore had great difficulty in ensuring the smooth operation of distance teaching. The great need for training in the use of digital teaching methods was also reflected in the study by Kundu and Bej (2021).

With regard to the technical equipment, the findings of Schober et al. (2020); see also Huber and Helm, 2020; Huber et al., 2020) show that the resources varied widely both at schools and in the teachers' homes. For example, Switzerland had significantly more and Germany significantly fewer technical resources than Austria. Moreover, governments were not prepared to provide resources for digital forms of teaching at the elementary school level (Helm et al., 2021). Many teachers criticized the fact that there was hardly any technical equipment at the schools and that using private devices was the only way to continue the lessons. Also, Klapproth et al. (2020) concluded that the lack of adequate hardware was considered one of the major obstacles faced by teachers during distance teaching. The findings of the study by Kundu and Bej (2020) suggest that technical difficulties, such as the sudden interruption of internet connection, often further aggravated the already challenging situation for teachers. Overall, the missing resources, time and support played a limiting role in the use of digital teaching and learning methods (Klapproth et al., 2020).

1.5 Aspects of Educational Policy

The school closures posed a major challenge for all actors and stakeholders in the field of education. Therefore, it was considered an important task of the political actors to provide school employees with all necessary information. However, as already mentioned, the insecurity regarding the state of affairs was considered a strong burden for teachers (Anderson et al., 2021). Teachers' lack of knowledge about what needs to be done and how distance learning will be implemented in the upcoming weeks and months was particularly addressed by Huber et al. (2020). Although the majority of the school staff felt that the guidelines passed on by the school authorities were helpful, around 34% stated that they had received too little information about further steps of action. Also, the results of the study by Kim and Asbury (2020) indicate that, shortly after the first school closures, the teachers interviewed felt strongly overwhelmed by the uncertainty of their situation. The teachers reported a lack of clear communication of important information from political leaders. The respondents expressed criticism on the non-involvement of teachers in school-related decisions during the pandemic (Kim and Asbury, 2020).

In conclusion, it appears that the vast majority of the teachers surveyed in the above-mentioned studies rated the communication of educational policy measures as poor. Therefore, much more government consultation and communication is desirable in order to eliminate uncertainties on the part of education institutions (Kim and Asbury, 2020). Since school closures can have negative long-term consequences, it is of the utmost importance that governments understand the problems faced by students, parents and, especially, teachers and principals. This knowledge will help to develop, if necessary, adapt and implement policies. In an OECD (2020b), the authors made recommendations on how teachers can be involved and supported in such situations. Most importantly, it was recommended that schools quickly adapt their teaching methods to distance teaching conditions. This would thus allow teachers to teach online when schools are closed. In France, for example, a network of local digital education advisors has been mobilized to help teachers transition from face-to-face to distance teaching. The network for digital education also offered school administrators online training courses on how to find and use available digital resources to practice. However, this could only succeed because all actors and stakeholders worked together (Vincent-Lancrin, 2020). Other countries such as the United Kingdom have made efforts to complement school resources and teacher efforts by providing high-quality online classes. In addition, in collaboration with teachers and education experts, they have adapted television programming to support home-schooled students (Van Lieshout, 2020).

2 THE PRESENT STUDY

To capture the teachers' perceptions of the pandemic-related challenges and to derive possible consequences for future educational policy and practice, a multi-method research in the sense of a combination of two qualitative data sets was carried out. Thus, the aim of this paper is to reveal the main challenges of distance teaching for elementary school teachers, who took part in the Inclusive Home Learning (INCL-LEA) project by Schwab and Lindner (2020a). The INCL-LEA study was conducted to learn from the experiences of teachers for future practice and to convert them into practical knowledge that can be implemented in school teaching in Austria. The following article tries to investigate the following research question:

- What main challenges did elementary school teachers in Austria perceive in the context of distance teaching due to COVID-19 during the first national school lockdown?

3 INCL-LEA PROJECT DESCRIPTION

In order to be able to deal with the research interest regarding the perceptions of Austrian elementary school teachers regarding their professional challenges due to distance learning, two different qualitative data sets from the INCL-LEA project were analyzed. The INCL-LEA study (see Schwab et al., 2020) was conducted to identify the effects of emergency school lockdowns in Austria. Besides teaching practices during distance teaching,

TABLE 1 | Characteristics of the interviewed teachers.

	Gender	School affiliation	Age	Teaching experience (years)
Teacher 1	Female	Regular school	49	27
Teacher 2	Male	Regular school (public)	49	4
Teacher 3	Male	Special needs school (public)	47	25
Teacher 4	Female	Regular school (public)	50	25
Teacher 5	Female	Regular school (public)	24	2
Teacher 6	Female	Regular school (public)	27	4
Teacher 7	Female	Regular school (private)	32	5
Teacher 8	Female	Special needs school	25	2

teachers', students' and parents' perceptions were assessed to get deeper insights into stakeholders' individual experience. The INCL-LEA project was developed following a mixed-method design that contains both quantitative and qualitative data collection procedures.

The data collection processes in the context of the INCL-LEA project included a quantitative online survey which 3,467 teachers from all over Austria took part in during the first school lockdown in Austria (April/May 2020) using LimeSurvey. The link to participate was distributed to school principals all over Austria via email. Further, 56 teachers were canvassed by applying the snowball method and interviewed during the same period. The interviews were conducted via Zoom and have been video-taped. The interviews lasted around 45–60 min and were transcribed.

3.1 Sample Description

In the study, only data from elementary school teachers were taken into account. Within the main quantitative sample of 3,467 Austrian teachers, 1,354 teachers worked in primary schools. Of these, only data from 803 teachers were included in the analysis, as this subsample answered all four open questions relevant to the present study. Most of the participants in the online study was female (92.7%). The average age of teachers was 44 years (M = 43.92; SD = 11.17), ranging from 22 to 64. The participating teachers had an average teaching experience of around 19 years (M = 19.07; SD = 11.98).

Of the 56, 12 interviews have been used for the analysis as these teachers are currently working within elementary education. Furthermore, for a better overview of the interviewed elementary school teachers who were included in the analysis, a table has been listed below with their most important characteristics, such as gender, if they work at a regular or special needs school, if they work at a private or public school and how long they have been teaching. Only the first eight interviewees (Teacher 1–8) listed in **Table 1** are relevant to this present study.

4 METHODS AND DATA

4.1 Online Survey

In the course of the INCL-LEA study, teachers filled out an online questionnaire including both quantitative and qualitative (open-ended) questions. Considering that the COVID-19 pandemic at this point was relatively new (first COVID-19 case in Austria was reported on February 25, 2020; see, e.g., Kreidl et al., 2020; the data collection started at the beginning of April 2020), this paper focuses on the teachers' subjectively answered open-ended questions in order to gain actual insight into the experience of the pedagogical professional and to open up the newly oriented phenomenon of homeschooling due to COVID-19. The teachers' perception of distance learning was measured using the following four (open-ended) questions:

1. What are the advantages and challenges of the current transition to home teaching?
2. What do you see as specific advantages as well as challenges for at-risk students (e.g., students with special needs, low-performing students, . . .) during home schooling?
3. What specific measures would be necessary to facilitate your work (especially at-risk students) during home teaching?
4. What else would you like to tell us?

These questions were at the end of a longer quantitative survey, including sociodemographic information and rating scales. In principle, answering these questions was voluntary and could be skipped in the course of answering the online questionnaire. To answer the research question, all four open-ended questions of the online questionnaire were considered, since it can be assumed that both implicit and explicit expressions regarding the professional challenges of teachers can be found within teachers' answers regarding all four open questions.

4.2 Interviews

The semi-structured interviews were carried out in collaboration with the SCHELLE study conducted at the University of Trier by Letzel et al. (2020). In the semi-structured interview, the interviewees were asked about three major topics: (a) homeschooling in general, (b) differentiation measures in homeschooling, and (c) evaluation and review of school performance.

In the first block of questions regarding *homeschooling in general*, among other things, the teachers were asked what experiences they had had with home schooling insofar (i.e., how the contact was with students, parents; what everyday school life in homeschooling looks like). They were also explicitly asked how the switch to digital teaching went and whether they had prior experience with using digital instruments for teaching, such as while studying. In the second block of questions regarding *differentiation measures in homeschooling*,

TABLE 2 | Categories qualitative dataset I.

Challenges for elementary school teachers	
Superordinate categories	**Sub-Categories**
Teaching during distance education	Instructional design
	Contact/communication with students
	Rapid changeover
	Assessment/feedback
	Finding teaching material
	No substitute for regular instruction
	Checking learning processes
	Transfer of knowledge
Technical equipment	Missing hardware but also lack of skills
Contact/support/communication parents/guardians	Lack of knowledge
Additional workload	Double burden work/private life
	Constant accessibility
Digital skills	Lack of skills (i.e., was not taught during studies)
At-risk students	Contact/accessibility
	Individual support
	Motivation
	Finding teaching material
	Checking learning processes
	Transfer of knowledge
Educational policy	

the interviewees reported on whether differentiation measures in homeschooling were possible. If it was possible, they were asked what form it took place in. In the last block of questions regarding *evaluation and review of school performance*, the teachers were asked how they control assignments and further tasks, assess them and give feedback. They were also invited to reflect on how they respond to the needs of students at risk (i.e., students with special educational needs or from socially disadvantaged families or with a lack of language skills).

4.3 Data Analysis

4.3.1 Analysis of Qualitative Dataset I

The teachers' responses to the four open-ended questions that were part of the quantitative survey of the INCL-LEA study (see **Section 4.1**) were analyzed using the MAXQDA software. In order to systematize the teachers' perceptions and to enable a comparison of code frequencies, the data were coded using a multi-level process. In a first step, an overview-like examination of the entire data was carried out. Subsequently, initial categories were formed in order to summarize key statements of individual teachers under specific terms. The subordinate category *challenges for elementary school teachers* as well as the categories *teaching during distance education*, *technical equipment*, *contact/support/communication parents/guardians*, *additional workload*, *digital skills*, *at-risk students* and *education policy* were created. In order to further specify the already defined categories, subcategories were formed in a next step, which in turn can be examined according to further subordinate categories (Froschauer and Lueger, 2003). Under *category teaching during distance education*, the categories *instructional design*, *contact/communication with students*, *rapid changeover*, *assessment/feedback*, *finding teaching material*, *no substitute for regular instruction*, *checking learning processes* and *transfer of knowledge* were developed. With regard to category *additional workload* the subcategories *double burden work/private life* and *constant accessibility* were formed. Finally, the following subcategories were added to category *at-risk students*: *contact/accessibility*, *individual support*, *motivation*, *finding teaching material*, *checking learning processes* and *transfer of knowledge*. After a second pass of open coding, those categories most frequently mentioned by the teachers surveyed were determined and structured according to their relative importance for the research question (Froschauer and Lueger, 2003). **Table 2** is a tabulation of the categories formed in the course of analyzing the qualitative data from the online survey.

4.3.2 Analysis of Qualitative Dataset II

The qualitative data from the interviews was also analyzed using a multi-level process and with the analysis software MAXQDA. In the INCL-LEA study, 56 qualitative interviews were conducted with teachers. First, these 56 interview transcripts were read through and evaluated using the topic analysis (Froschauer and Lueger, 2003), which resulted in a categorization. Second, in order to get an overview, the following categories were developed, which are based and adapted to the questions of the interview guide: *consideration of private circumstances and life situations of the students, perception of the students and parents regarding distance teaching, communication and interaction with students and parents, preparation time and extra work of teachers, general attitude and everyday life in homeschooling, first reaction of teachers when government declared lockdown, digital instruments taught in university and used in class, if teacher teaches in elementary school.* Third, the interviews were then assigned to these categories. In the further course of the analysis and categorization, the following selection of the twelve interviews resulted, which appeared suitable for a detailed and thoroughly analysis. For this paper, only eight

interviews (see **Section 4.2**) were evaluated in more detail and assigned to specific sub-categories in the joint analysis.

4.3.3 Synthesis of the Two Qualitative Datasets

The synthesis of the two qualitative data sets was carried out taking into account the triangulation of qualitative data sources formulated by Patton (1999). This research method can be characterized as a multimethod qualitative approach since it uses multiple forms of qualitative data. According to the author, this enables a comparison of the consistency of information obtained with different approaches in the context of qualitative methods. Therefore, an analysis of different teacher perspectives was conducted by comparing the information derived from the online survey with the information provided by those teachers who participated in the semi-structured interviews. The aim of triangulating two qualitative datasets is not to ensure a uniform result, but rather to uncover disparities and commonalities between different perspectives (Patton, 1999).

After the initial observation and individual analysis of the two data sets, a summary of the results and categories was created. In order to obtain similar results in the two qualitative data sets, the same categories that have been observed in both data sets were selected as main categories at the beginning of the joint analysis. Only those categories that were deemed relevant process were used for an in-depth analysis. Selected qualitative data were then analyzed in more detail and sub-categories were developed. The evaluation of both qualitative datasets (open answers to the online survey and guided interviews) was carried out using a topic analysis (Froschauer and Lueger, 2003). This evaluation method enables researchers to get an overview of the topics, core statements and the context of the research from a large amount of data. By reducing the text to the central questions, its dimensions and arguments can be analyzed and interpreted on a manifest level. This method is best suited for this sub-study, as the topic analysis in the narrower sense of qualitative research does not require exact transcriptions, since only the manifest content of what is said is conveyed.

In order not to influence the respective analysis process, the integration of the two qualitative datasets took place only in the course of the interpretation phase. As a result of the joint topic analysis, the authors created a system of categories ("topics") in which they assigned both the short statements (online-survey) and the interview quotes. The following paragraph presents the corresponding categories that the researchers found as common categories in both analyses and that are related to the most recent literature review. For a better overview, the results of the online survey are presented first and then supported by quotes from the semi-structured interviews. The original quotes are in German, but they have been translated by the authors of this present article.

5 RESULTS

Based on the results of both qualitative data, the following five main categories will be elaborated upon: *1) Personal contact with students; 2) workload and stress; 3) technical equipment; 4) digital skills; and 5) individual support for at-risk students.*

Regarding the number of coded text passages of the online survey, it appears that statements relating to *category 1* were by far named the most frequently (n = 115). Teachers also clearly expressed themselves with reference to those aspects that play a decisive role in *category 2* (n = 108). In addition, a large number of the teachers reported a lack of technical equipment (n = 87) as well as difficulties with digital skills (n = 43), in accordance with *categories 3* and *4*, respectively. Finally, some teachers (n = 26) said they faced difficulty in providing individual support to at-risk students, as per *category 5*.

The following section contains a detailed description of each of the main categories. Some answers from the online survey have been included, which are then supported with quotes from interviewed teachers in order to illustrate the selected topics.

5.1 Personal Contact With Students

Teachers stated that they had lost some of the most important elements of regular teaching due to the school closures, namely personal contact and direct interaction with students. The teachers pointed out that these relationships, which are a key element in elementary school, could only be experienced to a small extent during emergency distance teaching.

> "I love my job – I really do – but the personal contact with the kids, the social learning, I see that as my calling." (participant 164, female elementary school teacher, age: 41, teaching experience: 16 years)

Also, teachers reported that they suffered greatly from the lack of access to many students. Maintaining contact with students through their parents, which was the only form of communication for many teachers, was perceived as very stressful. In addition, teachers said that not knowing how their students were really feeling and whether they had difficulties with schoolwork made them worried. Therefore, the impossibility of responding to students' questions or problems immediately and without delay was named as a great difficulty.

> "I miss the personal, daily contact with the children. There is no substitute for the feedback and reactions of the children in order to be able to respond to their needs immediately." (participant 394, female elementary school teacher, age: 47, teaching experience: 17 years)

Several teachers even stated that some of their students could not be reached despite numerous attempts to establish contact, and towards whom teachers expressed great concern about maintaining their relationship.

Similar concerns were voiced by several other teachers interviewed, of which only a few quotes are shown below. For example, **teacher 1** in her 50s, who has taught for almost 30 years, described the situation as quite difficult. For her, the most pressing difficulty is the lack of immediate response and individual interaction with her students.

> "So really difficult, (. . .) this distance between us and the children. This doesn't normally happen in class with

elementary school children. You get a lot through the interaction, and so everything is delayed now. Of course, I offer that they can get in touch if they have any questions and so on, but that doesn't work so well. So, while it works during these online classes, with the whole class or part of the class, you can of course also do it in groups, and the children can respond, but it just stops after that. It's just a lot more difficult to get immediate feedback and to react quickly. Because the children want to know something at that very moment, and they are unable to reach me, of course they ask their parents first. This makes it more difficult."

Another teacher – named **teacher 2** here – perceived similar obstacles over the course of the lockdown. In contrast to Teacher 1, he was relatively new to the profession (started teaching 4 years ago) but has had similar feelings. The most difficult thing about the whole situation for him was the lack of contact, especially with at-risk students such as those from a migration background. In his opinion, distance teaching was a particularly negative experience for such students.

"In terms of my job, I don't like the situation at all. Well, elementary school teachers and homeschooling don't go together at all and that's where I need to make direct contact. I need the children in front of me and that's a very bad thing because online classes only work well with students from privileged backgrounds, albeit with exceptions, than students from socially vulnerable settings with a migration background. This is the biggest problem. So basically, I don't like it at all. Let me put it this way, I would forego this gained 'free time' if I could go to school normally and I'm glad that it will start again soon."

5.2 Workload and Stress

A large number of elementary school teachers reported a significant increase in their workload over the course of the school closings and the resulting emergency distance learning. Teachers stated that this increased workload was accompanied by an unprecedented mixture of work and living spaces. In particular, teachers who are also parents reported a double burden, as they had to live up to their role as committed teachers on the one hand and meet their parental responsibilities on the other.

"I am a single mom of a six-year-old child. I work for the school and take care of my child at the same time (also having to work on preschool tasks set by the KIGA for her child every day); this was a big challenge." (participant 164, female elementary school teacher, age: 41, teaching experience: 16 years)

"The double burden of taking care of my own children's homeschooling and taking care of my own class is very heavy one. Altogether, I experience it as very stressful!" (participant 163, female elementary school teacher, age: 37, teaching experience: 3 years)

In addition, many teachers stated that they had worked significantly more hours than before they began distance teaching. Some teachers even reported a 50–80-h work week.

"In the beginning, my work week was about 50 h. I also slept very poorly." (participant 503, female elementary school teacher, age: 50, teaching experience: 28 years)

In view of the extensive overtime and despite the difficult circumstances, the majority of the teachers made tireless efforts in order to ensure subject matter was as interesting and multifaceted as possible. The search for suitable teaching methods led to working hours that took on previously unimagined dimensions. The preparation for class, feedback for the students and the correction of completed tasks took a long time, as it was usually not possible for teachers to respond directly to student questions or to clear their doubts.

One of the few male elementary school teachers interviewed – **teacher 3** – said that he was particularly aware of the intertwining of private life and leisure time. Both students and teachers lost track of time due to the lockdown. Free time gave way to work, both becoming somehow connected and interwoven. This, in turn, led students to think the teachers were always available.

"I noticed that this leisure–work thing is extremely intertwined. That it is even less demarcated than it was before. Or it's well delimited otherwise! There is certainly less hourly intensity, but because of the delimitation, there are no boundaries. Class runs throughout the whole day. And the reaction of my own children was very interesting, "Can't you finally put your cell phone down, or can't you finally turn off this computer!" because they had the feeling that my attention was not with them. (. . .) And why do I have to keep checking my cell phone? And I tried to explain that this is my job that I am doing now. And that when my cell phone rings, I am not texting back and forth with a friend, but that it's part of my job. I then just showed it to them. But it is precisely in this dual role of a parent and a teacher that everything has run into one another and merged now. From early in the morning to late at night, somehow. That's for sure – even if I say that the bottom line is that the hourly workload is definitely less, it's also a way of saying it's exhausting. This [is] permanent. Yes, and then having your own children sit at home and feeling that they should be looked after, the students should be looked after, new learning material should be created, and feedback should be given. This-everything gets mixed up, which makes it tedious."

Teacher 4 had the same experience. She reported that, in her everyday life, being constantly available to the students all the time was exhausting in the long run.

"Well, I was always ready for the concerns of the children and parents. It starts at 6 a.m. with the first messages and ends around 11 p.m. every day. I must be

> constantly ready in addition to producing teaching materials and paying attention to students because a lot of personal things must simply be delivered continuously as everyone simply expects an immediate reaction. This is not only with the parents, but also the children, because most of them have cell phones or are allowed to use their parents' cell phones, and the children long to get in touch. It's extremely delightful, but not sustainable in the long run. It's very exhausting."

5.3 Technical Equipment

A large number of teachers reported the dearth of electronic devices. On the one hand, the lack of equipment in the schools was considered a major difficulty. For example, one teacher said that only three laptops were available for a total of 18 teachers in the school.

> "In elementary school, we are faced with the problem that the school is very poorly equipped in terms of IT. We have three computers for a staff of 18 teachers." (participant 1,127, female elementary school teacher, age: 59, teaching experience: 38 years)

On the other hand, teachers also stated that they had to purchase network devices because the school authorities did not provide them with any equipment. Many teachers assumed that their own acquisition of technical devices, which was considered a prerequisite for functional distance teaching, was taken for granted.

> "We constantly provide ourselves with private terminals and internet connections free of charge." (participant 5,027, female elementary school teacher, age: 54, teaching experience: 38 years)
>
> "The main challenge is the lack of digital equipment not only for students, but especially for teachers at the elementary level. All the teachers I know work from home with their private laptops and private smartphones." (participant 2,334, female elementary school teacher, age: 42, teaching experience: 23 years)

Thus, some elementary school teachers have had to raise funds to put digital teaching methods into practice. As a result, many teachers felt abandoned because the school authorities did not provide them with the appropriate technical equipment in good time.

Interestingly, in contrast to the open questions of the online survey, no indications were given in the qualitative partial study that the teachers had to purchase technical devices themselves.

5.4 Digital Skills

In addition to optimum technical requirements, digital knowledge was considered an important prerequisite for the successful implementation of distance teaching practices. In particular, the lack of support in setting up and acquiring the tools for digital teaching turned out to be a major obstacle for teachers. Some teachers reported that, due to the rapid transition to distance teaching and the lack of preparation, they had no knowledge of implementing virtual teaching methods. Moreover, several teachers claimed that the transition to distance teaching was especially challenging for their older colleagues as they generally have less experience with new technologies.

> "There was no time to adjust to it and learn how to deal with it, which was especially harder on my older colleagues." (participant 3,857, female elementary school teacher, age: 54, teaching experience: 24 years)

Many teachers stated that they had dealt intensively with digital forms of teaching during the school closures in order to be able to virtually deliver teaching content. Although most teachers had no difficulties with common communication tools such as e-mail, some were concerned about the correct use of other internet technologies such as video conferencing. Furthermore, several teachers reported that they had never dealt with digital teaching formats before.

> "The challenge is that many teachers (I'm one of them) don't have the special knowledge (of computers) and thus can't handle them that well. This stresses me out. Every week during video conferences, we hear "What else we are supposed to do and offer?" I don't even understand the basics." (participant 3,374, female elementary school teacher, age: 49, teaching experience: 27 years)

Overall, some teachers did not feel well prepared for distance teaching. Teachers stated that digital forms of instruction in elementary schools are hardly used or not used at all under normal conditions. The associated lack of experience and knowledge, according to the teachers, was the main reason that significant difficulties arose during distance learning. When asked whether teachers were prepared to use digital instruments in their studies, **teacher 5** said that she neither encountered nor used them before. It wasn't long ago that she graduated as she only has 2 years of work experience.

> "You can forget that, not at all. In no way. I mean, I have to say that, theoretically, we would have to visit this digital learning advanced training course. I haven't done that yet; I haven't gotten around to it yet. That didn't work out. If I had tried that, it might have made a little more sense, but basically, digital media, digital education was actually never an issue. Rather, teachers would say "By the way, you can do this and you could that" and there would be possibilities to change, but no. I don't think anyone expected something like this to be necessary 1 day. Which is actually questionable because anything can always happen."

Teacher 6, who also has little work experience, experienced the situation in a similar way to Teacher 5. She was overwhelmed by the whole situation and the transition, as she did not deal with digitization in education, i.e., the use of digital instruments, during her studies.

> "Actually, I wasn't prepared for this. I don't know, it wasn't that long ago for me now. I've been a teacher for 4 years and I was in afternoon care for 1 year. That means I just graduated 5 years ago and it wasn't really that much of an issue at that point. I can imagine that it is already a bit more of an issue in the curriculum, but nobody could have expected it to become so important 1 day. The value of digitalization has only come about in the last two to 3 years; this has now become even more important in the school sector. That's why I understand why I wasn't prepared because it wasn't that much of a topic until now, and especially in elementary schools. I think this was more of a topic in the changing middle school field. At the elementary school level, schools had dealt with it on a voluntary basis; but so far, it wasn't really mandatory."

5.5 Individual Support of At-Risk Students

Another key challenge for teachers was dealing with at-risk students (e.g., those with special educational needs, with autism spectrum disorder, of vulnerable socioeconomic status, with poor knowledge of German) during the school lockdowns. Most often the teachers mentioned facing obstacles in offering individualized distance learning to these students.

> "Supporting children with learning difficulties is a challenge." (participant 2,763, female elementary school teacher, age: 38, teaching experience: 17 years)

In addition, the teachers stated that it takes tremendous effort to motivate students at risk to undertake learning tasks. These children often do not receive the necessary support at home that they need to cope with the learning tasks.

> "It takes a great deal of personal effort to motivate at-risk students." (participant 4,710, female elementary school teacher, age: 61, teaching experience: 38 years)

From the teachers' point of view, giving increased support to pupils at risk turned out to be extremely time-consuming. It took a lot of dedication from the teachers to ensure that these students didn't fall behind.

Teacher 7, who works at a private school, mentioned that she became more aware of social divides in her class while distance teaching, especially with regard to at-risk students.

> "Because now you just notice (. . .) this social injustice even more. There are children who live in a sheltered home with five cell phones and three tablets and two laptops. They can choose what they want to use today. And they have parents who explain the tasks to them and siblings who practice with them. And everything is very idyllic, at least on the outside. Certainly, there will be difficulties too, but it's just a lot easier for them. And then there are children who may have a cell phone and use it, which they must share with their siblings who are also homeschooled, who have no parents, who have to take care of themselves, who have to motivate themselves. So, you notice that very much. Nobody is lost at school or in my class, but you can tell that a lot of children are physically there, but their attention is absent."

Teacher 8 has had the same experience. In contrast to the other teachers interviewed, she works as a team teacher at a school that teaches children with special educational needs. Teacher 8 said that distance teaching also affected parents, who not only looked after their children but also had to teach them.

> "We regularly hear from the parents that it is difficult to get them [their kids] to do something. Wherever we [as teachers] can only say yes, it is actually very, very difficult because that is also difficult for the children in the situation. They don't know what's going on either, because normally, they associate being at home with vacations. They have trouble understanding why there is such pressure and such a structural sequence all of a sudden. (. . .) Now that means, okay, then he didn't have to do anything for school from 8 to 11 in the morning for school. It's okay if you offer the children to split it up their time. As always, this is also reflected in their behavior, because everything that is done under pressure and coercion will not get the children any further. (. . .) [They must be told that this]is an exceptional situation, and you can learn differently this time."

6 DISCUSSION

During the COVID-19 pandemic, plenty of research have been conducted and already been published (e.g., recent literature overview by Helm et al., 2021). However, within the strict timeline, limited possibilities for preparing studies were available. Further, many published studies have a rather descriptive character and present rather superficial outcomes. Moreover, mixed-method approaches are missing and impede efforts to gain a deeper understanding of the situation. Therefore, the current paper aimed to combine data from a large nationwide online survey as well as data from interviews. The content focus was on elementary teachers' experience and perceptions towards emergency distance teaching during the first school lockdown due to the spread of COVID-19 in Austria.

The findings revealed that most participating elementary school teachers identified the missing face-to-face contact and direct exchange with students as a significant challenge. This is an

interesting result as previous research focused more on the importance of social contact among peers and less on the lack of contact between teachers and their students. In this context, the dependency of students on their teachers was still dealt with, rather than the other way round – the effects of COVID-19 on the social connection teachers feel with their students. Against this background, several studies pointed out the effects of teacher feedback on students (see, e.g., the meta-analysis of Wisniewski et al., 2020) and hardly observed the other side – teachers also seeking exchanges with their students. The result, however, is in line with a current trend in education: there was a shift from solely focusing on learning outcomes as an indicator of high-quality education to including aspects such as personal wellbeing (of students and teachers) and building social communities that provide a sense of social belonging. For instance, within the OECD Learning Framework 2030 (OECD, 2018), aspects such as attitudes and values are considered important for future education. Further, especially in situations of crisis, it is crucial to take social and emotional needs into account. Therefore, teachers may have viewed missing student contact as challenging having realized that they are unable to address students' individual needs in a sufficient manner. On the other hand, they may have also become aware that face-to-face contact is also a significant need for themselves and not solely for their students.

In line with several other studies all over the world (Kaden, 2020; Klapproth et al., 2020; Prado-Gascó et al., 2020; Tengler et al., 2020; Walker et al., 2020; Anderson et al., 2021), the current study pointed out that the unexpected and unplanned transition from regular teaching to distance teaching resulted in a significant increase in workload. On the one hand, teachers struggled with the challenges of the unexpected work-life balance (e.g., missing workspaces, missing equipment, childcare responsibilities for their own children also at home due to the closure of their schools). On the other hand, their job requirements changed dramatically.

Concerning the long-term effects of the high workload of teachers, programs focusing on the prevention of and intervention in stress factors and burnout have gained even more importance within the educational sector. Even before the spread of COVID-19 (which is still ongoing and still requires flexibility and higher engagement in teachers) and the associated changes and measures, there was a high burnout rate (Spenger et al., 2019) within this occupational group. Over the course of the pandemic, it has already been shown that parameters such as teacher job satisfaction decreased significantly while negative emotional experiences increased (see, e.g., Letzel et al., 2020). As such, appropriate measures are needed – independent of COVID-19 or other emergency situations – that prevent individual crises in teachers such as professional dissatisfaction or burnout while supporting and strengthening teachers in the development of a positive professional self-concept. In line with the latter, implications for practical improvements and educational policy need to be addressed. In this context, public visibility and appreciation of the teaching profession contributes not only to the enhancement of the profession itself, but also to individual development and professional self-confidence and self-concepts (Carlo et al., 2013).

Interesting results were found regarding challenges faced by teachers on a digital and technical level. Teachers criticize the fact that the mere provision of technical devices is not sufficient for high-quality distance teaching. Although the provision of hardware (laptops, tablets, etc.) and software for the main stakeholders within educational teaching and learning processes (especially teachers and individual students) is considered a basic condition for functioning distance teaching, opportunities for professional acquisition of digital competency for teachers are needed. This demand seems inevitable, as research on COVID-19 and teachers' digital competences shows that mature knowledge of teachers contributes significantly to the appropriate design of online lessons during distance teaching (König et al., 2020; Sánchez-Cruzado et al., 2021). But it is not only in the context of further potential school closures due to COVID-19 that the demand for teacher training seems to be of great importance. The ways in which social structures are shaping everyday life, as well as the participation goals that schools desire, require digital education. In future crises, multimedia education concepts should be derived and developed that can be incorporated into everyday school operation. What has been caused by a sudden and unavoidable shift from regular schooling to distance learning online opens up unimagined (social) possibilities for digital reorientation in the educational context of elementary school. This could be realized, for example, in school partnerships all over the world via digital exchanges through video calls since the technical equipment and its use in schools was necessitated almost everywhere during the last year. As such, the COVID-19 crisis might have started positive trends regarding digital socialization. Nevertheless, in the context of digital teaching and learning, it has to be noted that there is a pivotal difference between emergency distance teaching and intended, planned digital teaching and online learning.

Despite all adversities and challenges, with which teachers felt confronted during school closures and distance teaching, they had the opportunity to reflect on the strengths and weaknesses of their rehearsed and internalized pedagogical actions and approaches and develop a reoriented view on the needs of their students. The insight into the private life worlds of their students can furthermore help to create adequate learning situations during regular school operation and to define pedagogical orientation to the needs of students beyond the borders of the classroom.

Regarding the limitations of the current work, it must be stressed that the findings cannot be generalized. But even if the results are not considered representative, they do offer an insight into the life and work of a total of 803 elementary teachers in Austria. Furthermore, participation in the surveys was voluntary, therefore, more motivated teachers or teachers who felt a greater need to share their experience may have been more likely to take part. Within the online survey, the teachers were not contacted directly, but via their school principals. Therefore, the response rate is unclear as not every school principal might have forwarded the mail to their staff members. A further limitation of the study is

the consequences of the two data sets with different samples and sample sizes converging. Different sample sizes are inherent in the design, since quantitative and qualitative data are usually collected for different purposes: generalization and broad overviews or detailed in-depth description, respectively. Moreover, as in many research efforts during COVID-19, the results obtained cannot solely be considered a result of a changing learning environment. The crisis itself might have caused numerous other challenges, such as a lack of social contact in general, which further interfere with the remote teaching setting as well as intrapersonal challenges such as increased psychological stress. Finally, it would be beneficial if future studies included more mixed-method designs using triangulation because of the nature of the subject. In addition, studies comparing different emergency distance teaching and learning interventions would reveal national and international differences and similarities in education policy measures.

7 CONCLUSION

Against the background of the sudden unexpected change from the established classroom teaching to a completely new format of teaching and learning, the present research project was developed as a rapid scientific evaluation measure to give first insights into teachers' perception of challenges during distance teaching. Despite, or perhaps because of this rapid response, this paper provides rare insights into Austrian teachers' experience of the very initial phase of mandatory homeschooling. The results obtained thus not only reveal new challenges during the homeschooling phase, but also allow conclusions to be drawn about omissions or forgotten subject areas during ordinary teaching in a pre-pandemic period of schooling. The present study, which is considered a rapid response to the educational turnaround, allows for almost real-time reports right at the beginning of the pandemic, thus highlighting the force of change and challenges Austrian elementary teachers felt confronted with. This allows pre-pandemic failures to come to the force.

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 Local school authority of Vienna. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

SS and K-TL designed the INCL-LEA study and supervised the data collection. RC drafted the abstract. FW drafted the introduction and results sections. Further, FW analysed the data of the online survey and RC supported within the data analyses of the interview. SS, K-TL and RC drafted parts of the method section. FW, K-TL and SS drafted parts of the discussion section. All authors revised the manuscript critically, contributed significantly to the article and approved the submitted version.

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From Face-To-Face to the Online Space: The Continued Relevance of Connecting Students With Each Other and Their Learning Post COVID-19

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At the time of writing, the largest state in Australia is once more in full lockdown because of surging cases from the new variant strain of COVID-19. During the last lockdown in early 2020, we conducted a study analyzing the efficacy of mapping best-practice face-to-face university teaching into the online space. This article reports on the results of a survey from the perspective of student belonging. Isolation was the most prevalent theme recorded by students despite not being one of the research questions asked. The importance of adopting the model in online university courses in the current/post-COVID-19 world is presented.

Keywords: belonging, higher education, online, community, isolation

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INTRODUCTION

When in early 2020, the outbreak of COVID 19 required universities to deliver teaching online, lecturers were faced with the significant challenges to hurriedly transition to various learning management system platforms. The move to online delivery was considered by many providers to merely be a translation of recording existing face-to-face presentations in powerpoint and upload these presentations into a online delivery platform. This approach can been described as "emergency remote teaching" (Hodges et al., 2020, p. 3), and should not be under a misconception that it is online learning. Online learning design and its related nine moderating variables has been clearly articulated by Means et al. (2014) and highlights an ecosystem of learner support in relation to modality, pacing, student-lecturer ratio, pedagogy, lecturer and student role, communication, assessment and feedback.

In contrast, the push to transition online provided an opportunity to develop a course that met the criteria of an online learning design. The result was the development of a model on which we based an online course that sits within a postgraduate degree (Page and Garrad, 2021). This article shows the results of research conducted on student perceptions of learning within the course, where the authors examined the impact of the design restructure. The results indicated that students found the most helpful pedagogical approaches were those that assisted with minimizing isolation. This somewhat unexpected finding arose from the changing context of the university educational experience. Therefore, this article will consider the relevance of addressing how an online course structure can positively impact on students' experiences of belonging. In doing so, we will use an adaptation of the Three Spaces of Belonging theoretical framework (Baroutsis and Mills, 2018) to analyze and discuss the results of the research findings. The implications for future use of an online model (*Virtual Teams Model within the ACAD Framework*) to speak to student belonging in online university courses within a current/post-COVID-19 world are also discussed.

VIRTUAL TEAMS MODEL WITHIN THE ACAD FRAMEWORK

Virtual Teams is a term that indicates a group of people who work together, where often they are located in different geographical settings and use a variety of technological tools in the collaborative efforts to achieve a shared goal (O'Duinn, 2018). The use of the Virtual Teams approach was used to embed the pedagogy of working in groups in online learning. The reason this was regarded as necessary was that in order to meet the needs of learners, the university could not merely shift face-to-face content to an online interface. There was also the additional need to cater for 21st century teaching and learning. To become effective learners in any contemporary learning environment, students need to be problem-solvers, critical thinkers and be able to work in groups using digital resources (Yoon and Gruba, 2017; Stephenson, 2018; Benade, 2019). Carvalho and Yeoman. (2018) was initially designed for face-to-face teaching and learning to guide the principles of 21st century pedagogy and was then adapted embedding virtual teams to manage the difference between delivery modes. Using this Framework, we were able to map the components of a physical and socially situated design of the course, addressing epistemically concepts where emerging co-creation and co-configuration of learning occurred. We chose to use this framework as it connected the space and practice of contemporary pedagogy that could be mapped into the online context. The *Virtual Teams Model within the ACAD Framework* then steered the design of the online course.

Specifically, the model describes three areas of teaching and learning, and these are structure, process and outcomes.

Structure

Attention to structure includes the organization of course content that accounts for the relevance of material as well as the delivery of that material using multiple modes, such as video, text, readings (Yoon and Gruba, 2017; Stephenson, 2018). Further, within the structure, the role of the student should be carefully communicated which includes setting clear expectations. The role of the lecturer also needs to be well-defined, as the role will shift to facilitation rather than as a disseminator of information. This notion supports Prosser and Trigwell, (2000) understanding of the relationship between teaching and learning which they report to be of more benefit when these constructs are aligned. The course structure also requires consideration of the design of the learning platform, where mapping into an online platform involves deliberations such as the visual design of the online site itself as well as the use of technological platforms that are possible within it (Hu, 2015).

Process

Process considerations include the addition of experiential learning opportunities in the course that also enable learning through reflection (Felicia, 2011). Team building is a further necessary aspect of the course process and thought needs to be given to develop collaboration skills and establish processes to counter any difficulties students might encounter within their teams. Moreover, *Process* also needs to take into consideration how students undertake tasks. As tasks are co-created and co-configured activities, this requires teams to construct and share a project plan in order to direct the project's completion (Leal-Rodríguez and Albort-Morant, 2019). Finally, ongoing lecturer/student feedback is recommended as a necessary component within course design as it provides opportunities for students to engage with consistent formative feedback within the process cycle and to provide assurances of the fairness of the team process (Wiggins, 2012).

Outcomes

Outcome designs include task completion group co-constructivist collaboration activities. It is relevant to note that task completion can easily be overlooked in design, where task completion fails to align with the learning outcomes (Goodyear et al., 2018). The final concern of the *Outcome* process is to ensure that students understand the value and purpose of assessments and the role of the product (Aritz et al., 2017). This can be achieved by facilitating assessments that reflect "real-life" opportunities that students engage with (Iannone and Simpson, 2017).

SENSE OF BELONGING

Belonging, or social identity, is how we define ourselves and characterise the group in which we belong (Hauge, 2007). A sense of belonging can be understood within students' perception of being valued and respected by other students and by the university (Mulrooney and Kelly, 2020). Students who feel a sense of belonging to the university state that they are part of the community, and are recognized and accepted for their capabilities (van Gijn-Grosvenor and Huisman, 2020).

One of the challenges in accommodating a sense of belonging is the online platform itself, where a contrast exists between what face to face arrangements can provide that encourages a sense of belonging. Relationships are inherent in the development of a sense of belonging and to secure an identity as a learner (Kahu and Nelson, 2018). The physical space of a university campus offers students opportunities to meet face to face and to develop and strengthen their respective relationships both between students and between students and academic staff (Samura, 2018). Surroundings were profoundly altered because of lockdown, and student-teacher as well as student-student relationships in an online environment are now greatly different from that offered on campus. The shift to online spaces presents lecturers with an unexpected challenge of recreating some form of connectedness with students if they students are to maximize their learning experience.

The Benefits of Fostering Belonging

Having a sense of belonging is connected with student achievement and motivation and positive relationships with student success has also been empirically established (Knekta et al., 2020). For example, a sense of belonging has been associated with academic achievement (Abdollahi and Noltemeyer, 2018),

retention (Han et al., 2017) and persistence (Lewis et al., 2017). To have a sense of belonging has been shown to be particularly important for marginalized groups such as students with a disability (Moriña, 2019) and students with low socio-economic status (Ahn and Davis, 2020b).

Within the university, belonging is recognized as multi-dimensional and has been described to include four dimensions: social and academic engagement, surroundings and personal space (Ahn and Davis, 2020a). Ahn and Davis. (2020a) study strongly and consistently reported that social engagement was the most noticeable or important factor, while academic engagement was also regarded to be significant by students. Additionally, the study identified two other themes and they were surroundings (geographic location, natural environment, living and cultural space) and personal space (self-identity, self-esteem, life satisfaction). The findings suggest that belonging is a complex multi-dimensional phenomenon and that universities, in support student belonging, need to account for all four factors.

Assessing the assumption that social connectedness and friendships are important to foster a sense of belonging in Australian universities, studies conducted in the southern state of Victoria examined the effect of social events and activities on students' sense of belonging (Araújo et al., 2014). The research engaged first year students in various activities (for example, off-campus trips, in-class discussions and non-assessed tasks, and an on-campus exhibition event). Araújo et al. (2014) concluded that the actions listed enabled students to develop a strong sense of belonging. Building on these findings, the study was expanded to involve a university-wide approach. Students were again asked to rate the importance of student and campus-based activities and experiences. The findings showed 84% of students agreed that feeling respected or valued for their contribution in class was somewhat to extremely important in developing a sense of belonging. Other aspects regarded as important to fostering a sense of belonging included a feeling of fitting in with others and being counted by the institution.

Belonging in the Online Learning Space

Fostering a sense of belonging is seen as essential by many researchers, regardless of the learning environment, although literature exploring a sense of belonging and online learning continues to be limited (Peacock et al., 2020).

Peacock and Cowan (2019), using an adapted version of the community inquiry framework (Garrison, 2011) to scaffold action to nurture online learners' sense of belonging, found that dialogue in social, cognitive and lecturer spaces contributed to an improved sense of belonging in students. Thomas and Herbert (2014) analyzed the lecturer and student experience of online learning and sense of belonging, stressing the importance of robust dialogue in that it fosters "a sense of camaraderie that diffuse[s] some of the isolation" (p. 76) that might be experienced in online learning. Healthy reciprocal communication, they suggest, impacts on learning by reducing anxiety, helping learners to develop new ideas, and building connections. In contrast, the lack of social networks hinders the development of belonging. It is also realized that fostering a sense of belonging and encouraging learners to engage in communities of practice is a challenge for lecturers in the online environment (Thomas and Herbert, 2014).

Peacock et al. (2020) responded to the gap in the limited literature in online learning and belonging. Their research reported three important themes that promoted a sense of belonging. These themes were interaction and engagement, a culture of learning, and the presence of support. The concept of engagement was related to lecturers and students. Lecturers were reported as being pivotal to the development of students' sense of belonging, with comments such as "[lecturers] are the glue that bring it together" (p. 25). Engagement between students was facilitated by providing students opportunities to get to know each other before interacting with group tasks. A culture of learning emerged from reports that impacted positively or negatively on a student's sense of belonging. Examples were cited as how the module was structured, the behavior of the lecturer, the materials, and how consequent student behaviors were responded to. The final theme derived from notions of support. Levels of support such as sharing of issues, being offered advice and views on aspects of the course, course design, and family support.

THEORETICAL FRAMEWORK: THE "SPACES OF BELONGING" FRAMEWORK

Belonging in this article is viewed as the sociocultural connections that create ties to education spaces. Using spatial theory that makes sense of belonging in flexible learning spaces, we can consider how belonging is constructed through the different elements of space and how spatial elements can be developed and maintained belonging.

Baroutsis and Mills (2018) have characterized three elements that relate to belonging: relational, material, and pedagogical spaces that are associated with practices in education that are based on choice, shared respect and support. These spaces intersect to form the educational space: enabling and conversely disabling belonging, engagement, and connectedness within the setting. We will describe the characteristics of the spaces in the context of higher education. The first of the three spaces of belonging are relational spaces.

Relational Spaces

Space is an active mechanism that is created from a "complex web of relations" (Massey, 2013, p. 265). Relational spaces support and encourage social and emotional interactions between students (Baroutsis and Mills, 2018). The term "family" is often used by students when they describe relational space (te Riele, 2018, p. 252). If interactions include others that make them feel like they belong, then the space can be considered supportive and safe (Hooks, 2008). Practices within relational spaces promote a commitment to the overall group and to relationships within all members. Online social spaces have been used by students for some time (Cheung et al., 2011) and this "intentional social action" 1) facilitates a sense of connectedness and can be provided privately within existing learning management

systems, or, more commonly, are developed by students themselves (e.g., Facebook). The facilitation in design for social spaces, both private and public, can create a sense of belonging and positively impact on learning. It allows also, for the development of learning strategies that are particularly relevant given the shift to active and group-orientated learning approaches (Chatti et al., 2007).

Material Spaces

Bessant, (2018) refers to material spaces as physical forms of space, where social formations are produced and re-produced. Design practices promote a sense of belonging and connectedness. When online learning is configured in traditional ways, this may limit the affordances of the space. For example, when forms of traditional transmission such as pre-recorded powerpoint lectures are uploaded to the site, this does not allow for relationships to be created.

Daniels et al. (2017), argue that decisions about design and place can enhance or restrict a sense of belonging. When educational spaces are configured in a non-contested way, they can become environments that lend themselves to different social practices of teaching and learning and allow different interactions between those working in spaces. Spaces therefore, can be used to allow people to feel in control of their learning if designed to support equity (Leigh, 2019).

Physically, online learning lends itself to isolation (Chametzky, 2021). Attempts to combat isolation can be made by addressing configurations of the platform where the material might alienate some. The design needs to be welcoming and interesting and accessible. Students who struggle with understanding how to navigate the platform and access material therefore, are more likely to feel disengaged and distracted from learning (Gillett-Swan, 2017).

As a resource for belonging, material space can impact on how easily it is to meet the same people (te Riele, 2018). Therefore, material/physical spaces that are designed to enable the development of group identity within small group membership will assist belonging.

Pedagogical Spaces

Pedagogical spaces that develop a sense of belonging are created from the design of, for example collaborative practices where students feel that they are part of the community, and recognized for their abilities (Colón García, 2017). Traditional pedagogical spaces in contrast, typically characterized as one teacher, single cell delivery of teaching, serve to disconnect the students from the lecturer and from each other (Byers et al., 2018). When choice and meaning are provided for learners, and students attach and share their learning with real-life experiences, then deep connections are made between students and their learning and belonging as a learner (te Riele, 2018).

Educational Spaces

Finally, we will discuss the space that is created in the intersection of relational, material, and pedagogical space. Characteristically, educational space is often seen as "a container within which education simply takes (its) place, with varying degrees of effectiveness and efficiency" (Green and Letts, 2007, 57), instead of understanding the interplay of structures and environments that might occur. The knowledge that is formed within this university space might consist of attitudes and ideas that relate to how educational institutions may operate, and the role and identity of schools within universities. Here, alternative educational spaces are created, such as the construction of a learning space of belonging that is inclusive of all learners and unpacks boundaries that separate "teacher and student' or, in other words, "them and us" (Baroutsis and Mills, 2018).

METHODS

Participants

Participants were recruited through their engagement as students enrolled in the course at the University of Newcastle, New South Wales, Australia during Semester 1, 2020. Most of the student cohort were in-service teachers. Ethical approval was provided by the ethics committee at the university before undertaking research and informed consent was obtained by participants. Participants were invited to undertake an online survey using Qualtrics, (2019) at the completion of their course studies through an embedded link within the learning management system. Participants were asked to rate a series of questions from very helpful to not helpful (4 points scale) that evaluated the learning approach in the online learning space. A total of 67 surveys from a cohort total number of 180 were submitted and 24 records removed prior to data analysis because of being incomplete. This equated to a 37% response rate, and in educational contexts, lies within the average level of returned responses (Holbrook et al., 2007).

Participants were mostly female (84%) with 2% indicating they were male. Interestingly, 14% of respondents preferred not to report on their gender. Participants' reported age ranges indicated that most were between 30 and 49 years of age, which represented 72% of the sample cohort. In addition, only six respondents (14%) reported having no experience in working in teams as a means of task completion at the tertiary education level. This is followed by 12 participants with minimal experience working in teams, with most of the sample (58%) indicating they had an experience of group work for a minimum of at least 2 years. 37% of respondents indicated they had extensive experience of working in groups of 5 years or more (see **Table 1** for demographic data).

A. Do you have any comment about the **benefit** you found with these learning tools or features?
B. Do you have any comment about the **challenges** with these tools or features?

While the overarching research question of the study asked *In what ways if any, was the design using the Virtual Teams model helpful as a learning tool or feature during an online university course?* this article draws on a subset of that data which focuses on students reports of belonging as a result of responding to the qualitative questions in the survey. These questions were:

TABLE 1 | Demographic characteristics of participants.

Variable	Category	*N*	% Of sample
Gender	Female	36	84
	Male	1	2
	Prefer not to say	6	14
Age	20–29	9	21
	30–39	18	42
	40–49	13	30
	50–59	3	7
Online learning experience	None	3	7
	Minimal: 1–2 years	19	44
	Some: 2–5 years	15	35
	Extensive: more than 5 years	6	14
Experience working in task completion teams	None	6	14
	Minimal: 1–2 years	12	28
	Some: 2–5 years	9	21
	Extensive: more than 5 years	16	37

Data Analysis

Qualitative feedback collected within the survey was encoded through NVivo to identified key themes. From the initial data analysis, a key theme of isolation was identified, even though this topic was not asked in the research question. Subsequently, this theme was then explored in greater depth, looking for sub-themes.

Thematic Data Analysis

Qualitative feedback was collected from open-ended questions within the survey asking participants to comment on the benefits and challenges they found with the learning tools or features. The results were coded through NVivo (QSR International, 2020) to identify the key theme outlined within the model that related to isolation.

Both deductive and inductive reasoning was used through a thematic analysis approach, which considered themes based on the literature and the resultant interview data. The responses were analyzed, and grouped using the thematic analysis approach based on the recommendations of Braun and Clarke (2008) and Guest et al. (2012).

RESULTS

A coding theme of isolation as impacted by COVID-19 was explored to address the concerns of learners during the pandemic. The theme was coded into subthemes that were clustered according to relational, material, and pedagogical space. The results are reported in relation to these clusters.

Relational Space

In their open-ended question responses students consistently reported the value of group work. It was commonly reported as a beneficial feature of the course. Relationships mattered, and students described being with others within their group was important, especially since the closure of the campus. One student for example reported that "contributing and working as a group is something I truly miss about university on campus and this gave us a chance to have that".

Many reported being surprised how well the group engaged with each other and that the experience was a successful one: "We worked efficiently and effectively. I was surprised and fortunate to have a supportive, professional and helpful and cooperative group. The whole experience has been a positive interaction". Another stated, "I am grateful to have had this group, they were easy and hard-working. I was surprised as I thought online group work would be awful and it wasn't".

Several described feeling lucky, fortunate, and even proud of their group: "I feel lucky to have had the opportunity to work with my team"; "I feel lucky to work with such strong intelligent group" and "I am very proud of my group and how we worked together". These positive statements that connected students with their group were evident in statements that also described how students encouraged and motivated each other as a result such as one student who reported, "I was initially hesitant and anxious about working in a group online and then found that were we equally hard working and encouraged each other" and another who commented that "together we maintained motivation".

Some reported the importance of being able to feel supported that did not rely on the teacher such as one student who said: "together we nutted it out". Similarly, another commented that "my group provided reassurance". Feelings of support by the group was particularly important during times of lockdown as students had a platform to share lockdown experiences which was summarized by one student: "in our group, I could share my experiences of COVID-19".

The presence of caring staff was often reported, as one student noted: "I feel that the lecturer really cares about us, by talking about the difficulties of COVID-19 and being flexible about getting assignments in because we are stressed out". Connecting and being present for students was also found to be a reoccurring theme, as several recounted: "weekly face-to-face Zooms are essential".

Material Space

There was a strong response that spoke to feeling comfortable within the physical space of the course where connections were made, which in this case for students, was the technological platform. While some reported that they did not have the necessary skills to even understand the online platform, one key theme spoke to the types of communication tools that were more useful over others to ensure the success of their communication within groups. One student described, "we had IT [information technology] issues with clunkiness when we used the university system so we had to find something that worked".

Because the university learning system was generally regarded as "clunky" many turned to Facebook as an alternative as one student stated, "we had difficulties with Blackboard email, so went and used Messenger instead". Alternatively, Whatsapp was used by several groups for communication. The use of Zoom was mentioned often, especially as this providing face to face time, which strengthened relationships. "Zoom made it feel like we were in the same room together. This was especially bizarre as one of the four of us was in a different state and another in a different country! This was one of the best assignments I have ever done, I made new friends and it was exciting being able to discuss thoughts and opinions, gaining new insights and perspectives" stated one student.

Others spoke to the benefits of communicating on a platform that was situated in spaces other than that of the university site where open conversations could happen with no risk to students learning or outcomes. Student comments were summed up by one student who stated, "It gave us the space to discuss our thoughts and opinions freely. Such an opportunity is valuable."

For some, there were challenges in learning how to use some of the technology used in an online learning course. It was reported for example, that, "we were required to understand technology and [lockdown] forced us to learn that".

Pedagogical Space

The course pedagogical design proved valuable in supporting student engagement and outcomes which was achieved through the addition of educational instruction that aligned with online practices such as team tasks that were student-directed, but visibly equitable and supported by the lecturer. To meet this end, the importance of group-work moderation and equal sharing of workload was stated by several students such as one who reported that, "we were worried about [a student] in our group not pulling her weight or turning up to meetings, but the lecturer has said that there will be marking consequences for people who do this and we also have the peer assessment to report this", and another who commented that "the lecturer mediating group issues helped". Others reported they had a sense of having to "pull their weight" despite the difficulties of working online during the pandemic: "shared goals are important because it resolved any conflict that arose and besides, we were on the same page and I did not want to let my team down". The benefits elicited through engagement in the approach using student-directed group work during lockdown for participants related to a "decrease in the sense of isolation - which turned out to be very relevant" for many.

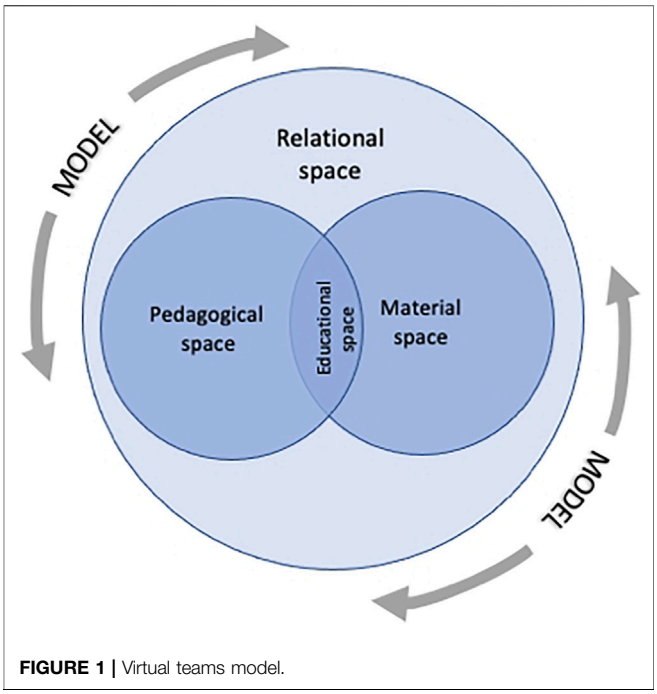

FIGURE 1 | Virtual teams model.

DISCUSSION AND CONCLUSION

The current study focuses on findings from a wider study that examined the learning benefits and challenges for students enrolled in a Masters' course found with a set of online tools and features. Specifically, this study examined the responses from students that related to their perceptions of belonging within the course. It was deemed pertinent at this time to highlight the findings that were reported by students in connection with belonging as New South Wales continues lockdown conditions that has resulted in the closure of the university.

The main finding of this study was a recognition by students of the importance of feeling that they belonged and additionally, the strong sense of connectedness by students towards each other and staff. The findings also spoke to the significance of developing relationships with staff and peers.

Our data suggests that it is important to help students develop a sense of belonging and to understand the benefits of a sense of community. We believe that the application of an online teaching and learning model (see **Figure 1**) has served to provide the necessary components that enable a sense of student belonging. How this has been enacted is described in **Figure 2**, through spaces of belonging.

Relational space, manifesting via students experience of working with others, was promoted through the model's provision of processes such as experiential learning and tasks undertaken through teamwork. It is worth noting however, that while students reported that they enjoyed the team aspect, this was not the case for all students. On few occasions, when students

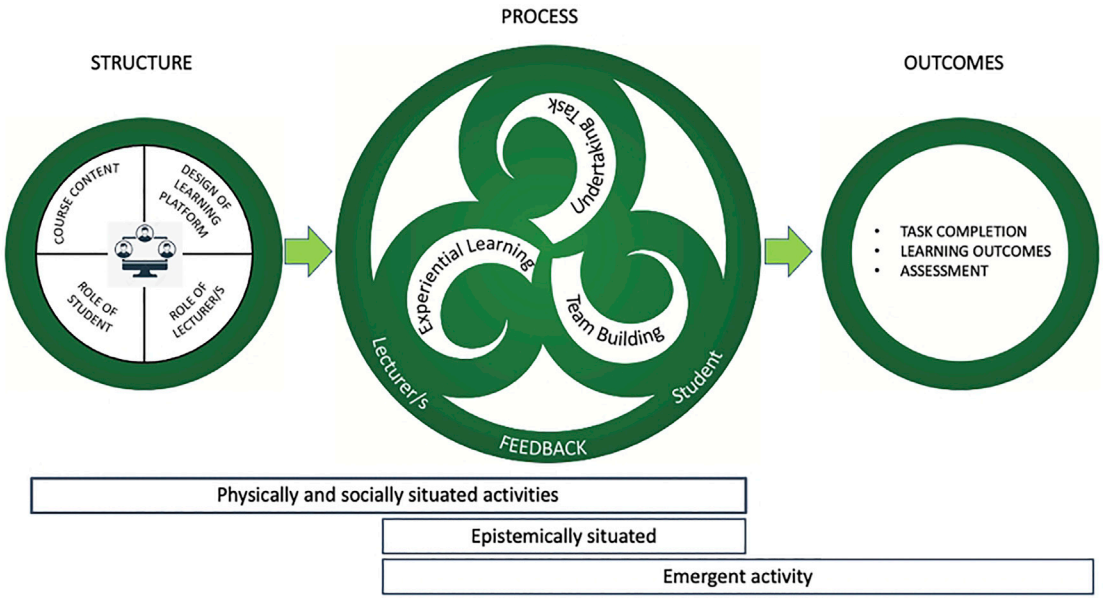

FIGURE 2 | Online learning to create spaces of belonging [adapted from Baroutsis and Mills (2018)].

reported to the lecturer that they would withdraw if they had to complete a group task, because for example, they experience heightened anxiety in groups, they were offered alternative individual assessment tasks. Overwhelmingly, students reported that at the beginning of the course they were very reluctant to engage in the group work, but at the end of the task, could see learning benefits and that they "enjoyed the group work". The material space that connected students was shown in the use of technology and design of the learning platform. Students needed to assist each other to complete tasks and at times did not have the skills and had to teach each other.

Finally, the impact of pedagogical space on student perception of belonging was demonstrated in student comments relating to where the model supported student-directed learning. This student-directed learning was assisted by a staff presence that served to provide students with help when needed.

How students engaged with each other and the relationship of teacher presence were all issues highlighted by Ahn and Davis (2020a) and Garrison (2016). Additionally, our data indicating the importance for students to develop a sense of belonging and to understand the benefits of a sense of community, also supports the findings from Mulrooney and Kelly (2020) who reported that reduction in students' sense of belonging since lockdown, when the campus closed and teaching and learning was forced to move online "is unsurprising; seismic changes to the structure of the day, physical environment in which individuals worked and ability to socialize occurred at very short notice within an environment of widespread fear" (p. 7).

From a practical perspective we also agree with Mulrooney and Kelly (2020) who suggestion that successful belonging can be shaped by developing: a mix of asynchronous and synchronous learning so that social presence is provided and individual work is embedded; enhancing lecturer presence by using audio and video is given; allowing students who find online interaction more difficult to participate (e.g., using chat functions rather than speaking); ensuring that clear guidelines are provided to students, so that they understand how to participate, and why it is relevant and; evaluating all components of online teaching to understand which features are more successful than others. Where our results reported that students found the most helpful approaches to be those that assisted with minimizing isolation can also be explained by the concept of interactivity. Interactivity is a contextual factor that is formed between students/lecturer/content if communication exists at a sufficient level (Anderson, 2003). If levels of communication between students, lecturers and content is insufficient, then learning and student satisfaction are compromised (Croxton, 2014).

Our results are also consistent with findings from Farrell and Brunton (2020) who highlight that belonging can be achieved through successful online student engagement influenced by the peer community, an engaging online teacher, and course design. Our study also contributes the understanding that outcomes for learning are positive if these design mechanisms are put in place. The key word here is "successful". If students experiences are positive, they are more engaged in turn, and are more motivated to contribute to their learning and assessment tasks. We note that the participant demographic information indicated that 84% of the cohort was female.

While low proportions of male participants are a typical problem of many online studies (Beißert et al., 2019), the gender relationship in this study is consistent with ratios in teacher education in New South Wales where two-thirds of all teachers are women (NSW Government, 2021). Gender however, is not considered to impact on the results of the study as gender was not, particularly as this would have been a "normal" learning environment for these students. However, as **Table 1** depicts, most of the respondents were females aged between 30 and 50, and so we might assume that this cohort would be in a relationship and more probable to have children at home with them. This factor would affect the likelihood that the participants would be needing peer support.

To conclude, recent lockdowns in Australia have once again placed immense pressure on the lives of both students and lecturers. However, it has also provided an opportunity to deliver continuity for those enrolled in higher education that allows an ongoing sense of connectedness and belonging to their learning. It is hoped that the findings of this study will assist the ongoing development of online teaching and learning so that students' needs can best be met in any circumstances.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusion 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 HREC, University of Newcastle. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

T-AG and AP contributed to the conception and design of the study. AP organized the survey and both researchers performed the thematic analysis. AP wrote the first draft of the manuscript. T-AG wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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Primary School Teachers' Perceptions of the Level of Development of Low-Order Cognitive Skills Under the Content and Language Integrated Learning Approach

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Content and Language Integrated Learning (CLIL) has become widespread in many countries around the world in an effort to improve learners' communicative competence in a foreign language (FL) and content acquisition in non-language areas (NLA). A successful CLIL programme must integrate the 4Cs, i.e., content, communication, cognition and culture. In this study, we focus on the synergies of developing thinking skills by combining language, content and cognition. Specifically, the aim of this study is to examine CLIL teachers' development of low-order cognitive skills (LOTS) in the subjects of Science and Social Science in the first two years of primary education in the Region of Murcia, Spain. For this purpose, we use a mixed method that combines qualitative and quantitative techniques to test the extent to which LOTS are developed within this integrated approach. The results show that most of the cognitive processes promoted by CLIL teachers are those related to fostering understanding among pupils, which sheds light on the strengths and weaknesses of these programmes and on a wide range of related factors on which further reviews are needed.

Keywords: cognition, teaching practice, primary schools, teacher attitudes, mental development

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INTRODUCTION

Content and Language Integrated Learning (CLIL) does not follow traditional foreign language teaching methodologies, and thus can bring about a change in teaching and learning processes, which involves the articulation of guiding principles that provide motivating classroom practice (Pinner, 2013). Thanks to its multifaceted character that rests on the pillars of content, communication, cognition, and culture, this methodological approach departs from the conventional methodological orientations inherent in the concept of foreign language (FL) teaching, not because the lesson is taught in a language that is not the learners' mother tongue, but because its dual-focus objectives involve the simultaneous learning of FL and non-linguistic content within the same teaching practice (Mehisto et al., 2008). For this methodology to be effective, it must challenge learners sufficiently to develop their thinking skills and engage them in the learning process in a cooperative way (Cenoz et al., 2014; Schietroma, 2019). To do this, learners are encouraged to construct their own meaning while learning content in a language that is not their mother tongue.

In articulating the development of students' thinking skills, many authors point to Bloom's taxonomy, as reviewed by Anderson and Krathwohl (2001), as a useful reference and guide for grouping a wide range of skills into understandable categories according to planned academic purposes. In fact, the range of thinking skills—namely remembering, understanding, applying, analysing, evaluating, and creating—is divided into two different categories: lower order thinking skills (LOTS) for the first three, and higher order thinking skills (HOTS) for the other three. This facilitates learners' progression from concrete to abstract thinking in a gradual manner (Martín-del Pozo and Rascón-Estébanez, 2021). In this sense, a list of cognitive skills ordered by lower or higher order thinking categories is much more effective than a simple list of skills ordered by relevance, or by topic, because learners can more quickly concentrate on what is asked of them if they know what the cognitive goal of each task is (Campillo-Ferrer et al., 2020). In fact, this hierarchical structure implies progressive mastery of each simple category as an essential prerequisite for moving on to the next more complex category, and this can help learners' self-assessment by providing them with information on the extent to which they have achieved the proposed objectives.

In addition, this taxonomy is also useful for teachers because it has the potential to indicate the extent to which various complex types of cognitive processes are being developed, thus measuring the relevance and appropriateness of specific instructional objectives and activities in a lesson, unit, or course (Krathwohl, 2002). It should also be noted that this hierarchy is flexible enough to allow for overlap between categories, thus favouring the design and implementation of instructional tasks in which the cognitive processes associated with one category may overlap with other processes related to another. This can be exemplified by reading an L2 text, as it may involve the development of decoding and comprehension processes associated with understanding (e.g., interpretation), and the retrieval of relevant knowledge associated with remembering (e.g., recalling). This flexibility can encourage teachers to ensure that there are sufficient opportunities for students to realise the potential of different thinking skills in multifaceted tasks, thus making them predictable (Hanesová, 2014).

If we scrutinise these categories in more detail, we realise that LOTS is central to all primary school subjects in order for learners to develop new ways of thinking and understanding that will enable them to progressively improve their competences, skills and learning outcomes (Tanujaya et al., 2017). This is even more important in CLIL classes, given the cognitive challenges involved in this integrated approach (Brewster, 2009). Children are exposed to subject-specific content that is very often outside their direct experience, which can easily make them feel overwhelmed. For example, in social studies lessons, pupils may find it difficult to explain how the past influences the present, or may even find it very hard to complete other subject-relevant tasks, such as making connections between historical periods in a second or third language (Cambridge ESOL, 2011). In this regard, Mary Coonan (2007) emphasises teachers' need to focus on learners' abilities in order to explore new subject-specific content and foster understanding of information (e.g., by filling in flowcharts, exemplifying or brainstorming). These effective strategies favour the extension of their cognitive scope to further higher-order thinking processes.

In fact, some studies have shed light on the effectiveness and impact of LOTS, such as the study published by Alonso-Belmonte and Fernández-Agüero (2018), which examined the relevance of HOTS and LOTS in primary education in the Spanish Community of Madrid using this approach, and provided evidence that the most recurrent teaching practices are those dedicated to enhancing LOTS, especially those associated with the activation of pupils' prior knowledge. In addition, Alcaraz-Mármol (2018) indicated that controlled activities associated with LOTS were implemented more frequently than other more complex activities in bilingual teaching in Spain. Similarly, Barut and Wijaya (2021) concluded that most CLIL practice in Manggarai Timur Regency was aimed at recall and comprehension rather than the development of more complex cognitive categories. Based on the knowledge and information derived from the literature, one can conclude the relevance of exploring how LOTS has been incorporated into CLIL teaching practice in order to foster students' dual-focus learning.

Within the framework of CLIL programmes, this study focusses on primary school teachers' perceptions of their teaching practice in a monolingual context in which non-language areas, namely Science and Social Studies, are taught through a language other than the children's mother tongue. In particular, this research aims to examine the relevance of LOTS in CLIL teachers' everyday practice in the first two years of primary education. More specifically, within the continuum of this dimension of cognitive processes, the study also focuses on which cognitive processes are most developed in CLIL classes. In addition, the relationship between teachers' gender, years of experience and type of training is also analysed, as previous studies have shown the influence of these variables on regular teaching practice (Infante et al., 2009; Klassen and Chiu, 2010; Pawan and Craig, 2011; Alonso-Belmonte, 2014).

RESEARCH METHODS

Objectives

The aim of this research is to identify to what extent and how CLIL teachers exploit the potential of LOTS in Science and Social Studies in the first two years of primary education.

RO1: To detail CLIL teachers' views on the development of the cognitive category "Remembering," and, in particular, to examine teachers' different perceptions of the exploitation of the cognitive processes associated with this category according to years of teaching experience, gender and level of CLIL training.

RO2: To obtain information from CLIL teachers on the development of the cognitive category "Understanding" and, in particular, to analyse teachers' perceptions of the exploitation of cognitive processes related to this category according to years of teaching experience, gender and level of CLIL training.

RO3: To obtain detailed feedback from CLIL teachers on the development of the cognitive category "Apply," and, in particular, to examine teachers' perceptions of the exploitation of cognitive processes associated with this category according to years of teaching experience, gender and level of CLIL training.

In order to achieve these aims, CLIL primary school teachers were consulted using a combined quantitative and qualitative methodology to examine the issues in depth. The participants' responses on both dimensions may provide a broader picture of the educational remains of this educational innovation in order to introduce improvements that will facilitate CLIL educators' teaching practice.

Sample

In the quantitative study, the sample consisted of 129 CLIL teachers in the Region of Murcia who taught science and social science in the first two years of primary education. In addition to the time dedicated to FL teaching, at least 2 h per week, depending on the number of NLAs selected in each school, the number of hours per week in English by participants is initially 3.5 h taught in five classes per week. 76% per cent of the participants in the quantitative study worked in public schools and 24% in public schools. Of the CLIL teachers who completed the questionnaire, 78% had a B2 level of English according to the Common European Framework of Reference for Languages: Learning, Teaching and Assessment (CEFR), while 19% had a C1 level of English and 3% a C2 level. Participants' teaching experience ranged from 1 to 30 years, with an average of 11.6 years' experience. Only 16% of the participants had earned an undergraduate degree in intercultural bilingual education, which meant that their professional training under this approach was acquired after they had completed their university studies. 22% of the respondents had little or no previous training in CLIL.

Regarding the qualitative study, it should be noted that many previous studies have adopted this methodological approach in an attempt to understand how teachers perceive and make sense of their daily work in different ways and from different perspectives (Papaja, 2014; Roiha, 2019; San Isidro and Lasagabaster, 2019; Turner and Fielding, 2021). In particular, 12 primary school teachers took part in the discussion forum (DF), where they were able to discuss ideas about their teaching practice more freely and openly. 60% of the participants worked in public schools and 40% in public schools. Their teaching experience ranged from 7 to 20 years. In terms of L2 proficiency, 66% had a B2 level, 25% a C1 level and 9% a C2 level. The twelve did not have any bilingual qualifications and their CLIL instruction was acquired after they had completed their university education. Three sub-groups were held to encourage discussion and exchange of views on current CLIL practice in primary education. The discussions were recorded and transcribed using a series of categories according to the cognitive processes they addressed. The open-ended questions encouraged primary teachers to share their views and feelings about teaching science and social sciences through English as a foreign language to native speakers of Spanish.

Instruments

The instruments used for this research were a semi-structured questionnaire and a discussion forum, which have been widely adopted in social science studies. As stated by Williamson (2013), they are popular data collection techniques that favour the collection of information from a large number of respondents. The questionnaire was developed *ad hoc* and validated by a group of experts in the field, who had bilingual teaching experience under this approach and worked at the University of Murcia. Several revisions were necessary to adjust the instrument to the technical requirements suggested by these experts.

The first instrument consisted of several blocks of questions covering the range of items related both to the specific personal and professional profile of the respondents and to the application of LOTS in this context. In particular, the questionnaire included questions related to the frequency of LOTS application: (i) remembering, (ii) understanding, (iii) applying, and also asked participants to rate the frequency with which they fostered the following lower-order cognitive processes: (i) recognising, (ii) remembering, (iii) interpreting, (iv) classifying, (v) explaining, (vi) comparing, (viii) inferring, (ix) summarising, (x) executing and (xi) applying.

The second instrument used was the discussion forum, which is a qualitative data collection technique, usually providing detailed accounts from participants and helping the researcher to better understand critically expressed ideas (Marra et al., 2004). Thus, its main advantages are related to fostering personal interactions, face-to-face discussions and synergetic communication, which enabled participants to exchange their impressions of their everyday bilingual teaching practice without any constraints. The participants' opinions were recorded using the Voice Record application and then transcribed for analysis. We decided to use it because the sample was small and transcription would not be so arduous. The meetings were recorded (total recording time was 140 min) and transcribed. In-depth notes were written about the teachers' opinions, identifying possible categories for further coding. Each discussion forum included six questions on how participants implemented their teaching practice from a cognitive perspective and what advantages and disadvantages they identified in this approach. The questions revolved around their experience with this approach and were as follows (a) Are you satisfied with the results of this approach in terms of cognition? (b) Is professional training a key element in CLIL teaching? (c) Do you agree with the sharing of resources to improve your teaching practice? (d) Should there be greater coordination between CLIL teachers? (e) what cognitive processes are most commonly used in CLIL teaching? and (f) what significant improvements and specifications can be suggested to optimise this approach?

Procedures and Data Analysis

The questionnaire was placed in Google Drive cloud storage and emailed to CLIL teachers. The opinions expressed by the

respondents were received online after informing the participants of the main objective of this research and the instructions for filling in the questionnaire. Once the information was collected, the steps in the data collection process were as follows: All respondents' questionnaires were classified into different subgroups according to some variables, such as gender, level of CLIL training, number of years of experience or type of school. After reclassifying the respondents' answers, the data were analysed and compared between the subgroups. The frequencies of all items were then measured and the percentages obtained were presented in tables for better visual grouping of the results and more efficient readability.

In addition, non-parametric tests were applied because the collected data did not follow a normal distribution. These tests helped to find statistically significant differences between the groups, which may facilitate the understanding of the key findings of this study. SPSS version 25 was used for the analysis. The degree of reliability of the questionnaire was measured before carrying out the data analysis procedures. It was calculated using Cronbach's alpha and the positive results indicated a high level of reliability ($\alpha = 0.94$).

Regarding the qualitative methodology adopted in this study, the chosen instrument, the discussion forum, was used to collect the information provided in three private meetings with participants lasting 45 min each. Participants' ideas and opinions were analyzed using qualitative content analysis. Their opinions are presented in the cross-reference tables in the following section, in order to complement the results obtained from the analysis of the questionnaire response data and thus increase the validity of this study.

RESULTS

This section shows the results of the analysis of the three individual cognitive categories and the opinions expressed by CLIL teachers to foster them in class, which may define the implementation of LOTS in the first two years of primary education in the Region of Murcia.

Specifically, according to the respondents' assessments (RO1), most of the planned activities are geared toward pupils' understanding of NLA content in both public and private schools, with 88% of teachers in public schools and 92% in private schools favouring the development of this cognitive category, indicating a high frequency in both educational settings. The other two cognitive categories, applying and remembering, are less developed but with little percentage difference. In terms of gender, both male and female teachers also focus more on promoting understanding than other LOTS (see **Table 1**).

In terms of participants' CLIL training, some differences have been found, with highly trained teachers focusing more on remembering, compared to the other subgroups who concentrate more on understanding. In terms of respondents' years of teaching experience, there is a clear focus on promoting understanding in CLIL lessons in all subgroups examined (see **Table 2**). No significant differences were found between the subgroups under study.

TABLE 1 | Development of low-order cognitive skills (LOTS) according to where content and language integrated learning (CLIL) teachers work and their gender.

LOTS	Primary school				Gender			
	State		Private		Men		Women	
	M	SD	M	SD	M	SD	M	SD
Remembering	4.21	0.88	4.11	0.95	4.10	1.06	4.22	0.85
Understanding	4.39	0.72	4.59	0.84	4.34	0.71	4.48	0.67
Applying	4.26	0.67	4.31	0.49	4.21	0.68	4.28	0.73

In line with these results, participants in the discussion forums emphasised the relevance of understanding over other thinking skills.

Teacher 9: Well, yes, in my experience with some children, they have better fluency and, above all, understanding.

Teacher 11: That's true. I see that, I mean, from one grade to another, understanding is much higher, communicative intention is much higher as well.

Teacher 12: If my children read a text, most of them understand it very well. If they listen to an oral comprehension, they also understand it very well.

In addition, they were generally satisfied with the cognitive development of learners' understanding of content in FL (DF-Question a).

Teacher 5: Well, we haven't finished the year yet. I think the level of the students is very good. I think this group is ready.

Teacher 6: We are pleasantly surprised by the level of the students in speaking and even in writing.

In relation to the frequency of use of the cognitive processes associated with each LOTS (RO2, RO3), CLIL teachers agreed on a wide use of the processes with no notable differences between categories (see **Figure 1**).

Specifically, in relation to the dependent variable "interpreting," related to the cognitive category "understanding," the Mann-Whitney U tests revealed statistically significant differences ($U = 1144.50$; $p < 0.05$), with teachers in state schools fostering this lower order cognitive process more frequently than those in public schools. Within the category of "understanding," for the dependent variables "explain," "summarise," statistically significant differences were also found in relation to the type of school where they work ($U = 1071$; $p < 0.05$; $U = 1133.50$; $p < 0.05$). Furthermore, within the category "apply," for the dependent variables "execute" and "implement," some statistically significant differences were identified in relation to the independent variable "type of school where they work" in favour of those working in state schools ($U = 1019.50$; $p < 0.05$; $U = 1043$; $p < 0.05$) (see **Table 3**).

According to the opinions expressed in the discussion forums, public school teachers are very much involved in promoting cognitive processes related to the cognitive category "apply" which help pupils to acquire and construct new knowledge in a manipulative and cooperative way, although they would like to have more resources for this purpose (DF-Questions c, e, f).

Teacher 6: We want to do really experimental Science, with manipulative things, but there are a lot of things that we don't

TABLE 2 | Low-order cognitive skills (LOTS) development according to teachers' content and language integrated learning (CLIL) training and years of experience.

LOTS	Competence in CLIL						Years of experience							
	L		M		H		< 5		5–10		11–20		> 20	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Remembering	3.68	1.10	4.21	0.87	4.51	0.64	4.17	0.93	4.31	0.85	4.13	0.93	4.06	0.92
Understanding	4.27	0.88	4.49	0.67	4.42	0.57	4.60	0.49	4.59	0.58	4.28	0.83	4.25	0.57
Applying	4.24	0.73	4.18	0.78	4.31	0.61	4.21	0.79	4.36	0.78	4.26	0.71	4.12	0.51

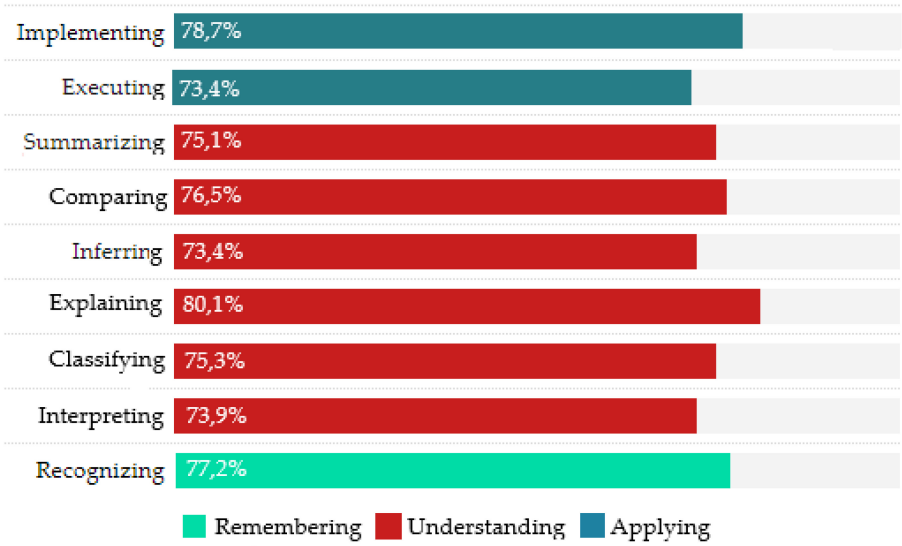

FIGURE 1 | Development of cognitive processes associated with low-order cognitive skills (LOTS).

have at hand for the kids, like a sink or a cooker that has burners, that has lab flasks, test tubes, that has things to do really manipulative Science.

Teacher 5: Yes, that's true.

As for gender as an independent variable, non-parametric tests indicated significant differences in relation to the dependent variables "explaining" and "interpreting" in favour of female teachers ($U = 1097$; $p < 0.05$; $U = 1128$; $p < 0.05$) (see **Table 4**).

Participants' responses in the discussion forums also revealed their interest in developing these processes in CLIL lessons.

Teacher 4: The oral skills they have are very impressive to people who don't know them at first. We really enjoy listening to them expressing their ideas, communicating with them.

Teacher 5: Yes, it is very noticeable.

Teacher 1: It's very noticeable between the bilingual courses and the ones that are not bilingual. I think it's quite noticeable.

Furthermore, participants attached great importance to coordination between CLIL teachers in order to have a positive impact on pupils' performance and work on NLA content (DF-Questions b and d).

Teacher 2: And also, CLIL has been very useful. The issue of bilingualism has favoured cooperative work much more, from the beginning, for example, my colleague and I went to a training course and from the first day we realised that it is very necessary with bilingualism. You can't just arrive, give a master class and go home, and put on your pyjamas, no, you have to work on a lot of things.

As for the results obtained according to the respondents' level of training in CLIL, significant differences were found in the dependent variable "compare" within the category of "understanding" in favour of those with a higher level of training ($H = 9.557$; $p < 0.05$) (see **Table 5**).

In line with this, some participants expressed the need for better training and coordination (DF-Questions b, d, f).

Teacher 7: I also think that what has happened is that there has been a bit of a rush when it comes to us all becoming bilingual and the teachers have not had time to train. There are teachers who have, because they have trained on their own, but it has all been a bit of a rush and there are some teachers who are very good, but others who are a bit inexperienced.

Teacher 10: It's absolutely true.

As regards the development of cognitive processes in CLIL teaching practice according to the participants' years of experience, the Kruskal-Wallis tests reveal significant differences in "interpreting" (clarifying new content) within the category of "understanding" and "implementing" (using NLA content for different purposes) within the category of "apply." Thus, more experienced teachers carry out more activities to develop these

TABLE 3 | Non-parametric results of the development of cognitive processes according to the type of school where they work.

Thinking skills	Group	Mean rank	Sum of ranks	Mann-Whitney U	Z	p.
Implementing	State	69.46	6877.00	1043.00	–2.60	0.009*
	Private	50.27	1508.00			
Executing	State	69.70	6900.50	1019.50	–2.80	0.005*
	Private	49.48	1484.50			
Summarizing	State	68.55	6786.50	1133.50	–2.12	0.034*
	Private	53.28	1598.50			
Comparing	State	67.50	6484.50	1350.50	–0.252	0.548
	Private	63.35	1900.50			
Inferring	State	65.50	6484.50	1435.50	–0.282	0.778
	Private	63.35	1900.50			
Explaining	State	69.18	6849.00	1071.00	–2.44	0.015*
	Private	51.20	1536.00			
Classifying	State	67.83	6715.00	1205,00	–1.66	0.097
	Private	55.67	1670.00			
Interpreting	State	68.44	6775.50	1144.50	–1.99	0.046*
	Private	53.65	1609.50			
Recognizing	State	68.18	6750.00	1170.00	–1.86	0.063
	Private	54.50	1635.00			

*$p < 0.05$.

TABLE 4 | Non-parametric results for the practice of cognitive processes by gender.

Thinking skills	Group	Mean rank	Sum of ranks	Mann-Whitney U	Z	p.
Implementing	Men	59.88	1796.50	1331.50	–0.905	0.365
	Women	66.55	6588.50			
Executing	Men	55.72	1671.50	1206.50	–1.67	0.093
	Women	67.81	6713.50			
Summarizing	Men	64.42	1932.50	1467.50	–0.106	0.916
	Women	65.18	6452.50			
Comparing	Men	62.03	1861.00	1396.00	–0.508	0.612
	Women	65.90	6524.00			
Inferring	Men	58.18	1745.50	1280.50	–0.1.20	0.227
	Women	67.07	6639.50			
Explaining	Men	52.07	1562.00	1097.00	–2.28	0.023*
	Women	68.92	6823.00			
Classifying	Men	54.55	1636.50	1171.50	–1.86	0.063
	Women	68.17	6748.50			
Interpreting	Men	53.10	1593.00	1128.00	–2.09	0.036*
	Women	68.61	6792.00			
Recognizing	Men	56.98	1709.50	1244.50	–1.42	0.156
	Women	67.43	6675.50			

*$p < 0.05$.

processes than less experienced teachers ($H = 8.058$; $p < 0.05$; $H = 7.833$; $p < 0.05$) (see **Table 6**).

In relation to this question, some less experienced participants asked for more information on previous teaching methods in order to have a more complete picture of all teaching practices (DF-Questions b, d, f).

TABLE 5 | Non-parametric results of cognitive process practice according to the level of content and language integrated learning (CLIL) teacher training.

Thinking skills	CLIL training	Mean rank	Kruskal-Wallis H	gl	p.
Implementing	High	70.34	2.354	2	0.671
	Mid	61.02			
	Low	64.48			
Executing	High	67.64	1.560	2	0.816
	Mid	67.52			
	Low	58.07			
Summarizing	High	75.59	6.953	2	0.138
	Mid	53.44			
	Low	68.72			
Comparing	High	69.30	9.557	2	0.049*
	Mid	57.03			
	Low	66.88			
Inferring	High	67.96	3.468	2	0.483
	Mid	56.12			
	Low	67.71			
Explaining	High	68.68	0.812	2	0.937
	Mid	65.47			
	Low	65.78			
Classifying	High	70.25	3.754	2	0.440
	Mid	69.82			
	Low	57.97			
Interpreting	High	76.68	4.362	2	0.359
	Mid	64.32			
	Low	58.90			
Recognizing	High	61.45	2.262	2	0.688
	Mid	71.83			
	Low	62.83			

*$p < 0.05$.

Teacher 8: I agree with her. What happens is that I have no point of reference. I have never in my life taught this area in bilingual education.

Teacher 9: We are English specialists, so we have never taught Sciences or Social Studies or other subjects that are taught in bilingual education, so we don't have. what some people say "when I taught Science the children knew more," we can't either.

DISCUSSION

Content and Language Integrated Learning (CLIL) teaching revolves around certain principles to enhance its scope for the effective development of thinking skills (Ito, 2019; Valverde Caravaca, 2019). In this sense, and taking into account the widespread growth of CLIL programmes and the increasing number of educational policies in this respect, effective teaching skills are essential for providing quality education, considering the importance of adequately promoting meaningful communication and articulating thinking processes for this advancement (Vilkancienė, 2011).

On these issues, significant insights into the development of LOTS have been gained by examining teachers' reflections on

TABLE 6 | Non-parametric results of the practice of cognitive processes according to teachers' years of experience.

Thinking skills	Years of experience	Mean rank	Kruskal-Wallis H	gl	p.
Implementing	> 20	73.94	7.833	3	0.049*
	11–20	73.38			
	5–10	62.66			
	< 5	50.89			
Executing	> 20	62.25	1.610	3	0.657
	11–20	67.72			
	5–10	67.52			
	< 5	58.30			
Summarizing	> 20	69.25	1.030	3	0.794
	11–20	65.70			
	5–10	66.22			
	< 5	59.39			
Comparing	> 20	63.63	3.461	3	0.326
	11–20	73.63			
	5–10	60.33			
	< 5	60.48			
Inferring	> 20	63.72	2.382	3	0.497
	11–20	66.67			
	5–10	69.16			
	< 5	56.30			
Explaining	> 20	74.19	2.850	3	0.415
	11–20	64.87			
	5–10	67.04			
	< 5	56.35			
Classifying	> 20	70.19	1.552	3	0.670
	11–20	66.78			
	5–10	65.74			
	< 5	57.98			
Interpreting	> 20	70.81	8.058	3	0.045*
	11–20	62.91			
	5–10	73.77			
	< 5	50.11			
Recognizing	> 20	62.06	2.771	3	0.428
	11–20	66.45			
	5–10	70.01			
	< 5	56.19			

*$p < 0.05$.

their CLIL experiences. Firstly, it is possible to assert that thanks to the initiative of educators committed to the implementation of CLIL teaching programmes, it has been possible for LOTS to develop significantly and take on an important role in learners' cognitive progression, as other studies also confirm (Alcaraz-Mármol, 2018; Alonso-Belmonte and Fernández-Agüero, 2018).

It is argued that this initial cognitive development is essential as a means of paving the way for more complex cognitive processes within this approach, which helps to determine the congruence of lesson plans and activities consistent with this basic principle (Puerto and Vázquez, 2016).

Be that as it may, this study has shown that CLIL teachers plan, act and teach thinking skills in very different ways that encourage learners to construct content knowledge in an L2 by activating various cognitive mechanisms and promoting meaningful ways of thinking aimed at triggering content and language learning processes (Martínez-Serrano, 2020).

The reasons for this heterogeneous development are diverse and depend on different factors, such as their experience in these programmes, their CLIL teacher training or the type of school in which they work.

In particular, the impact of the type of school, whether state or private, on CLIL programmes and, more specifically, on the improvement of LOTS has been shown to be a relevant factor in the development of CLIL practices. According to the participants' responses, teachers working in state schools attach more importance to the implementation of practical activities than those in private schools. In fact, practical work is one of the most relevant tools enabling learners to learn procedural knowledge which focuses on the correct performance of actions (Vlasenko et al., 2020). For this reason, teachers in private schools should encourage more practical work in their CLIL classes so that learners are not deprived of some essential thinking skills that provide useful cognitive stimulation and support. A more functional approach, based on learners' needs to communicate effectively and construct meaning in the L2, would be essential for learners to learn more effectively, for example, by carrying out simple experiments in project-type work, detecting correspondences and drawing conclusions from the information presented in group work activities, among other meaningful tasks (Mary Coonan, 2007).

In relation to this issue, CLIL teachers also shared their impressions of the difficulties they face every day in adjusting the space, time and materials available to the methodological requirements associated with this approach (Luanganggoon, 2020). This often meant a lack of opportunity for them to foster the thinking skills essential for practical work, due to the challenge of a broad curriculum to teach and the need to adapt their content and methods accordingly (Martín De Lama, 2015; Chew and Cerbin, 2021). In particular, some of the challenges teachers face in improving students' thinking skills include having sufficient time and knowledge to make content and language accessible, and adapting and designing appropriate materials for their teaching practice within the framework of this time-consuming approach (Moore and Lorenzo, 2015). Obviously, specific contextual factors can affect the effectiveness of teachers' strategies in addressing these challenges. Therefore, the availability of shared cooperative time among educators within their daily practice to reflect on the preparation and delivery of CLIL lessons based on the main CLIL principles and subject-specific curriculum guidelines can substantially enhance the development of these cognitive skills in the classroom (Ball et al., 2016; Hofstadler et al., 2021).

There are also significant differences between participants in the development of other thinking skills in CLIL programmes in primary education according to other variables such as their years of experience in these programmes. In fact, going a step further to understand NLA content more deeply, it has been found that more experienced participants focus more on summarising subject information than less experienced teachers. Another important criteria to be taken into account for this

cognitive development is teacher training in the CLIL approach (Pérez Cañado, 2018). Although teacher training for CLIL is becoming a key concern for many educational administrations around the world, as it is considered a compulsory part of the education degree programmes of many higher education institutions, a significant percentage of teachers in the Region of Murcia, 22%, embarked on CLIL with little or no experience in CLIL teaching and consequently had to face the different challenges related to this approach almost on their own, while at the same time looking for training opportunities outside their regular working hours, and focusing on cooperative work among other colleagues to bridge the existing gaps in their teaching practice. In a similar study in Spain, Fernández and Halbach (2011) addressed a number of concerns related to CLIL teachers' needs. The research participants clearly highlighted a need for training in teaching science in English (62%). In relation to this issue, (Cabezuelo Gutiérrez and Fernández Fernández, 2014) also highlighted teachers' need to be trained in methodology and classroom management.

For this reason, in order to prepare them to manage these educational situations more easily and become better CLIL teachers, education administrations should provide more specialised training on how to better adapt their teaching methods to this dual-focus approach (Gondová, 2012). It is therefore essential that teachers receive training on the many ways in which pupils' cognitive learning can be harnessed and extended in CLIL classes. In this respect, training courses aimed at designing appropriate lessons that integrate specific cognitive processes into specific subject tasks may be a crucial step in harnessing the potential of this integrated approach. Accordingly, flexibility, affordability, quality and personalised support are some of the key features that should characterise these training courses so that teachers can have sufficient resources and information with which to practise CLIL cognitive skills before entering the classroom and make the most of their daily work (Pladevall-Ballester, 2015).

Consequently, it seems that there is a need to discuss further the effective practices for addressing LOTS under this approach. The development of these cognitive categories is context-dependent and closely related to the expertise and training of those who use them in specific settings, leading to the need for strong targeting if we want to obtain the most accurate results that can be replicated in similar contexts. Therefore, further research is needed on the practical delivery of cognitively challenging tasks aimed at optimising CLIL learners' thinking skills (Barut and Wijaya, 2021).

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

PM-M determined the research theme, research framework, questionnaire design, data analysis method, and was responsible for the finalization of the manuscript. J-MC-F was responsible for literature collation, questionnaire implementation, and draft writing. PM-M and J-MC-F was responsible for the writing of research hypothesis, data analysis, result discussion, collection, collation of literature, and the collation and analysis of data. Both authors contributed to the article and approved the submitted version.

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Reinvigorating the Desire to Teach: Teacher Professional Development for Creativity, Agency, Stress Reduction, and Wellbeing

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Research suggests that teachers' creative development may materialize in more resilience and joy and less stress, but these connections have received little attention. This mixed methods study analyzes the effectiveness of a hybrid professional development model focused on teachers' creative agency during the COVID-19 pandemic, a period of intensified stress, anxiety, and disconnect. Results indicated the PD experience supported (a) an increase in teachers' creative agency, empathy, joy, buoyancy, and support in teaching during the pandemic and (b) a reduction in their secondary traumatic stress. Qualitative analyses illustrated a variety of personalized pathways for this development. The evidence suggests teachers' creative agency and wellbeing can develop through a complementary process, rooted in creativity and the arts.

Keywords: creativity, agency, secondary traumatic stress, professional development, resilience, arts integration, mindset

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INTRODUCTION

Teachers experience stress frequently in their profession (American Federation of Teachers, 2017). Up to 45% of teachers may experience burnout at some point (Schaufeli and Enzmann, 1998). Though burnout may contribute to a loss of roughly 40% of new teachers after their first 5 years (Ingersoll, 2002), some feel that what is really at stake is chronic teacher demoralization (Santoro, 2019). Whereas burnout places the responsibility on teachers' self-care, demoralization recognizes the effect of systemic inequities, insufficient resources, and instability of constantly changing reform initiatives. Collie et al. (2012) noted that international studies from the past five decades indicate a third of teachers report being stressed or "extremely stressed." For a profession that is focused on doing good work for society, the narrative of *demoralization* may be a better fit than *burnout* to account for the ever-increasing moral and ethical challenges facing teachers.

The COVID-19 pandemic has only exacerbated this ongoing issue. During the pandemic, more than three quarters of surveyed teachers in a 2021 study indicated frequent job-related stress—two times the rate of the general adult population (Steiner and Woo, 2021). An EdWeek Research Center study found that over half of teachers said they were "somewhat" or "very" likely to leave teaching within the next 2 years (Loewus, 2021). The kinds of stressors and ethical challenges teachers have faced are unprecedented. A new path needs to be charted in teacher preparation and in-service professional development to foster adaptability to manage these increasingly complex conditions and to reinvigorate educators' desire and joy for teaching.

In addition to professional stress and demoralization, teachers also navigate the trauma their students face—a phenomena called *secondary traumatic stress*, or STS. Students across the world have experienced some degree of disruption or trauma due to the COVID-19 pandemic (JED Foundation, 2021); for instance, six in 10 parents reported their child experienced mental or emotional health challenges (within the past month) during the 2020–2021 school year. Teachers have been managing the demanding task of offering support to students as they navigate serious mental health risks, such as suicidal ideation (Becker, 2021). Teachers have adapted to support their Students' academic and social-emotional needs while also developing ways to manage their own stress and anxiety, including the STS they face on a day-to-day basis in their work with students. The stressful ethical dilemma teachers face to care for their own needs while the needs of their students continues to climb should not be underestimated. The intensity of stress and demoralization coupled with STS suggests not only a challenge to the sustainability of the teacher profession, but also an emerging mental health concern in a large public service sector of the workforce—a concern largely ignored to date (Hydon et al., 2015). Those figures present an unsustainable state of workplace mental health for teachers—a veritable "canary in the coalmine" issue for administrators, researchers and policymakers, alike.

This current study builds on the premise that the COVID-19 pandemic represents a seismic disruption, requiring teachers' to develop their *creative agency* to be strong in their beliefs and values for creativity in teaching and learning, adaptive in the face of uncertainty, empathetic to students, and multidisciplinary and integrative in how they teach. Past research demonstrates how creative agency directly links to the resilience needed to face disruption and widespread trauma, such as a global pandemic, with the buoyancy and adaptability to bounce back and maintain wellbeing (Anderson et al., 2021; Orkibi, 2021). As prior research linking teachers' creativity and wellbeing in the face of disruption has been rare, this study aims to contribute new evidence and understanding about this intersection, shaping a new path for teacher development. This mixed methods study addresses these gaps by investigating an innovative professional development (PD) model, called makeSPACE, that personalizes teacher creative development (find more information at www.makespaceproject.org). This study examines the extent to which PD focused on teachers' creative resources may help reduce their STS, anxiety facing ambiguous challenges, and general negative affect, while also helping to increase their joy, creative beliefs, empathy, buoyancy, and general positive affect. Results can help shape how the education field approaches teacher development after the traumatic experience of the pandemic.

THEORETICAL FRAMEWORK

We propose that teachers working in socioeconomically marginalized schools have likely dealt with high levels of STS during the pandemic. The development of their creative agency may enable them to thrive in the stressful circumstances of their jobs and maintain, or even enhance, their joy in this meaningful profession, even when the challenges may be extreme and demoralization high. Different aspects of creative development have been linked to overall wellbeing across the lifespan (Cohen, 1989; Anderson, 2019, 2020; Orkibi, 2021) and the resilience to bounce back from setbacks in the face of adversity (Sweetman et al., 2011). Thus, the framework described further in the following sections and illustrated in **Figure 1** defines and examines how creative agency may buoy teachers' resilience and joy in the face of disruption and stress, such as STS.

Creative Agency for Teachers

The *creative agency for teachers* framework builds on the model of creative behavior as agentic action (Karwowski and Beghetto, 2018), which has been growing a body of supportive evidence at both the student and teacher levels in schools (see Anderson et al., 2021, 2022). Creative agency for teachers incorporates extensive research on the individual-level factors that cultivate creativity (i.e., original and appropriate ideas and solutions) and the agentic process that brings this creative potential to life through action in and exchange with the world. The notion that personal agency incorporates an individual's values, beliefs, and reflection is rooted in Bandura's (1986) social cognitive theory. The development of values and beliefs related to creative teaching and learning may be especially important to teachers. For instance, teachers' mindset about creative abilities for themselves and their students has emerged as an important part of teaching for creativity in the classroom (Karwowski, 2014; Hass et al., 2016; Katz-Buonincontro et al., 2020).

Before teachers will take risks with innovative strategies to support students' own creative learning and agentic development (Anderson et al., 2022), teachers need to feel (a) more creative self-efficacy in the classroom and (b) less creative anxiety in taking risks and trying new things (see Daker et al., 2019). Recent research has illustrated that professional development focused on teachers' self-beliefs and affect toward creativity can effectively prepare teachers with the necessary beliefs and affect for creative teaching and learning in the classroom (Anderson et al., 2022). Moreover, at the beginning of the pandemic, one study found that the support teachers perceived for creativity had a strong correlation to their positive affect and joy in teaching and lower degree of negative affect in their work (Anderson et al., 2021). That finding emphasizes the role of the environment and influence of others in agentic development.

In this framework of creative agency for teaching, teachers' creative mindset and self-efficacy can fuel their buoyancy, joy, wellbeing, and stress management. Teachers' own experience in creative development may be key to their understanding and awareness of the student experience taking creative risks (Bereczki and Kárpáti, 2018; Rubenstein et al., 2018; Anderson et al., 2022). Integrating creative opportunities into the student learning experience may only be effective if teachers hold this understanding—what we refer to as *cognitive empathy for creative risk-taking*. Following the original definition of empathy from Rogers (1951), teachers must be able to think at the level of "what if" to understand the view, experience, and feelings of students in the context of creative learning. In qualitative research,

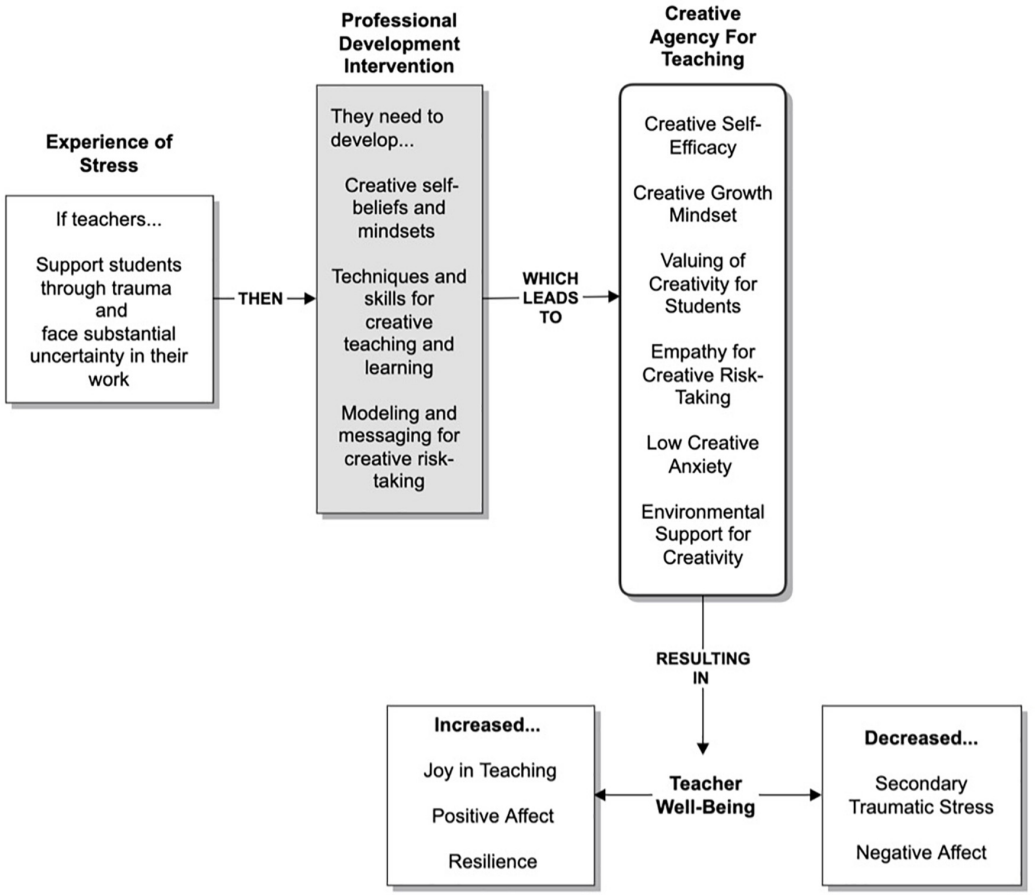

FIGURE 1 | Theoretical framework connecting teacher professional development to the cultivation of creative agency for teaching and teacher wellbeing.

teachers shared that this type of empathetic understanding at both conceptual and experiential levels as learners themselves was a vital piece of their own creative development (Anderson et al., 2022). This type of empathy fits well into the social cognitive perspective undergirding human agency (Carré et al., 2013; Bandura, 2018)—it enables them to cultivate learning environment conditions for students' creative expression and development (Anderson, 2019).

Secondary Traumatic Stress for Teachers

Research across several decades cites many different sources of stress for teachers with the two most consistent stressors being workload and student behavior (Collie et al., 2012). As Santoro (2019) suggests, teachers' demoralization goes beyond feeling burnt out by those kinds of stressors and relates more to caring deeply about the students they teach under conditions that don't allow them to do what is good and right. As such, we suggest teachers' STS plays a key role in their general demoralization in teaching. The negative effects of secondary exposure to a traumatic event can parallel the effects of primary exposure. Researchers have described this secondary traumatic stress as compassion fatigue (Figley, 1995). Those secondary effects result in intrusive imagery related to traumatic disclosure, avoidant responses in behavior and thinking, and physiological arousal, distressing emotions, and functional impairment (Bride et al., 2004). Though our understanding about the secondary traumatic stress experienced by teachers may be growing, little attention has been paid to the needs of teachers to respond adaptively to this type of stress prior to or during the COVID-19 pandemic.

Secondary traumatic stress is "the natural, consequent behaviors and emotions resulting from knowledge about a traumatizing event experienced by a significant other. It is the stress resulting from helping or wanting to help a traumatized or suffering person" (quoted in Bride et al., 2004 from Figley, 1999, p. 10). Teachers can be the first to witness, hear about, and respond to the trauma that children and youth experience through crises in and out of school (Hydon et al., 2015), and the COVID-19 pandemic has been traumatic for many students (Becker, 2021; JED Foundation, 2021). This current study builds on the empirical research studying the experience of professionals in clinical settings, by incorporating the three factors of intrusion, avoidance, and arousal (Bride et al., 2004).

Interventions to develop teachers' mindfulness practices for stress management demonstrates promise following three primary tenets: (a) to develop attentive awareness to focus one's mind on the present, (b) to have a receptive attitude and openness

to experiences in the present, and (c) to have intentionality in both the practice itself and in the emphasis and direction of that practice, such as compassion to oneself and others (Taylor et al., 2021). These studies have not included secondary traumatic stress, specifically, nor do mindfulness practices alone address the demoralization that arises for teachers supporting students living through traumatic experiences in untenable conditions. In fact, the third tenet of mindfulness may be counterproductive for dealing with "compassion fatigue." From a social cognitive theory perspective on human agency (Bandura, 2018) mindfulness practices on their own may not include sufficient actionable and *agentic* support and direction for teachers to take.

This study's framework, detailed in **Figure 1** and described in the following sections, proposes that teachers' agency for their creativity in teaching and learning is essential for their adaptability and wellness in the face of common and severe stressors, such as STS. As described in **Figure 1**, this study positions teachers' values, mindset, self-beliefs, affect, and empathy related to creativity in teaching and learning—their overall *creative agency*—as a means to reduce their STS and enhance their reslience, joy, and wellbeing. This model proposes that teachers will inevitably face stress and uncertainty, especially during a universally disruptive and traumatic experience such as the COVID-19 pandemic school shutdown. That experience demands two types of adaptive shifts. The first shift is in the inward self-beliefs, mindset, and affect about ones' own internal creative process and creative potential to take risks in the first place. The second shift is in the mindset and understanding about the creative development of students in the classroom. If PD can facilitate a shift on both dimensions, and potentially increase the environmental support for creativity in their school among colleagues, then the PD should also help to decrease STS and enhance joy and resilience for teachers during challenging and emotional times.

Resilience and Joy to Counteract Stress

Finding ways to maintain joy throughout challenging circumstances may require some creative efforts and the resilience to bounce back from setbacks when trying new approaches. In the medical profession—potentially the hardest hit by the pandemic—some have reinvigorated, or begun anew, creative activities, and passions to boost their resilience (Farris, 2021). Creative work in the arts, specifically, has a long history of therapeutic application. For instance, research found that drawing with a distraction object (e.g., draw a house) improved the mood better for children than if they were asked to express themselves through drawing (Drake, 2021). Forgeard et al. (2021) found improvements in the mood, general self-efficacy, mindfulness, and social connectedness, among other factors, for adult participants from a partial hospital program who experienced a 50-min unstructured art-making activity in a clinical setting. A unique program to develop teachers' resilience, called BRiTE (Building Resilience in Teacher Education), provides a strong foundation for developing teacher understanding and skills in resilience (Mansfield et al., 2021). Other scholars and practitioners have built from that foundational work and incorporated arts-based methodologies to enhance teacher reflection. This previous work suggests that arts-based methods toward creative development could enhance teacher resilience to stress and provide new pathways for joy and wellbeing in their work—the focus of this current study.

Professional Development for Creative Engagement

Teacher creativity in teacher preparation and PD has largely been ignored by the education research community (Katz-Buonincontro and Anderson, 2018; Anderson et al., 2022; Bereczki and Kárpáti, 2018). The high levels of uncertainty and stress teachers have faced and the demand on their creativity during this pandemic have been noteworthy. The circumstances have revealed a depth of creative resourcefulness and ingenuity teachers bring to their work. However, the role of creativity in teacher's professional efficacy and perseverance requires more conceptual and empirical development and research. The proposed concept of creative agency in teaching can help fill this gap and complements the social-psychological perspective of creative engagement in learning. Creative engagement links the need for autonomy, belonging, and competency to the need for creative meaning-making in the learning process (Anderson, 2018; Anderson et al., 2020). Teachers need to develop the necessary agency to be creative (i.e., the values, mindsets, self-beliefs, and affects toward creativity) and their understanding of how and why conditions for creative engagement must be established in the classroom. Therefore, teacher PD should focus on modeling these conditions for teachers' own creative engagement and skill development to strategically integrate creative opportunities for their students. This kind of experiential modeling is best practice in adult training (Salas et al., 2012). By experiencing those conditions as learners, educators cannot only understand the process of setting these conditions, but also feel and recognize the importance of having these conditions established as a foundation for learning and creative development.

As documented in previous research (Anderson et al., 2021, 2022), this approach to teachers' creative engagement should focus first on understanding the creative process and reflecting on one's own unique approach, and second on experiencing introductory routines and strategies within different modalities that naturally incorporate the creative process. By starting with routines then moving onto more demanding instructional design, teachers' can experience small successes themselves on a path toward creative agency to establish inclusive learning conditions for students.

Present Study

This study applies the underlying framework to the makeSPACE PD process for teachers, using a hybrid experience that blends online asynchronous learning with virtual synchronous training within a community of practice. A concurrent mixed method approach (Creswell and Plano-Clark, 2018) tests the framework by analyzing close-ended survey scales along with open-ended survey responses. The purpose of analyzing both types of items was to examine change across time in factors of interest

and contextualize the quantitative findings through teachers' descriptions of how the makeSPACE PD experience affected their teaching during the pandemic. The following research questions guided this study:

1. To what extent did teachers' creative mindset, self-efficacy, empathy, and anxiety change before and after the PD experience (quantitative)?
2. To what extent did teachers' wellbeing factors of joy, resilience, general affect in teaching, and STS change before and after the PD experience (quantitative)? If STS appeared to decrease, which subfactor had the strongest effect size?
3. How do teachers describe the effect of the PD experience on preparing them to deal with the COVID-19 pandemic (qualitative)?
4. How do teachers describe their creative strengths as teachers (qualitative)?
5. How do teachers report dealing with the stress of the pandemic and supporting their students through this disruption (qualitative)?

MATERIALS AND METHODS

Participants

Participating teachers in this study ($N = 53$) enrolled in a blended arts integration for creative engagement PD experience based on broad dissemination efforts to schools and districts across Oregon and California. The demographics included $n = 2$ teachers identifying as Hispanic, $n = 51$ teachers identifying as white. In the sample, $n = 36$ teachers identified as female, $n = 16$ as male, and $n = 1$ as gender queer. Teachers came from more than 30 schools, every content area, and all levels of K-12. The mean for number of years teaching was 14.25 years, the median was 13, and the modes were 6 and 8 years of teaching. Nineteen percent of teachers were novice teachers with less than 5 years of teaching experience and 45% of teachers had less than 10 years of experience. These schools represented mostly rural regions that ranged in size and extent of remoteness and diversity of socioeconomic factors, such as race, ethnicity, and economic privilege.

Measures

We used an explanatory concurrent mixed method design (Creswell and Plano-Clark, 2018) with two phases. Phase 1 focused on quantitative analyses from within-subjects analysis of variance between pre- and post-training teacher survey data. Phase 2 analyzed teachers open-ended responses in the post-program survey to understand the effects from Phase 1. Phase 1 quantitative analyses included teachers' pre-program survey data completed by teachers when they began their professional development experience and post-program survey data completed after finishing the final modules of the online 18-h asynchronous Foundation Course. Approximately half of the sample completed a 14-h synchronous virtual Summer Institute during the program period as well. Phase 2 qualitative analyses included teachers open-ended responses in the post-program survey using a thematic analysis to identify patterns and seek an explanatory understanding of any effects revealed in Phase 1 analyses.

Pre- and Post-survey Scales

The teacher survey was completed during initial login to the online platform and after completing the course. Teachers were asked to complete the survey by choosing one response to each question. For most constructs, response options were on a six-part Likert scale (i.e., 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4 = Slightly agree, 5 = Agree, 6 = Strongly agree). Teachers were provided with the following definition of creativity so that there was more consistency in how teachers would interpret the questions: *While there are several ideas about the definition of creativity, creativity generally is the ability to derive novel, high-quality, and relevant ideas, products, or services. Before responding to the following questions, please think about your teaching practice and reflect on what creativity means to you and your students.* All survey items are included in **Supplementary Appendix**.

Affect and Wellbeing

This study used or adapted measures validated in past research to study perceptions, beliefs, and experiences related to psychological, affective, and creative phenomena (see **Supplementary Appendix** for complete protocol). We adapted the prompt for the Secondary Traumatic Stress Scale (STSS) from Bride et al. (2004) to focus on the teaching context during the past term of school, using an average score that included the subscales of *intrusion, avoidance,* and *arousal*; a sample STSS item was "*It seemed as if I was reliving the trauma(s) experienced by my students."* The STSS items were measured on a 1–5 modified frequency scale where 1 = Never and 5 = Very Often (see **Supplementary Appendix** for all items). We assessed teachers' joy in teaching using the dispositional joy scale with slight adaptations to be directed at teachers (Watkins et al., 2017). For instance, one sample item was "*Many things about being a teacher bring me delight."* As a proxy for everyday resilience in teaching, we modified the Academic Buoyancy Scale, developed by Martin and Marsh (2008) to focus specifically on the experience of setbacks typical to teachers (e.g., *I don't let teaching stress get on top of me)*. To assess the general psychological wellbeing of teachers, we used the Positive and Negative Affect Scale (PANAS; Watson et al., 1988). We adapted the prompt to fit the teaching context: "*Indicate to what extent you have felt this way generally in your work as a teacher this past year (e.g., interested, distressed, excited, etc.).*"

Creative Agency for Teaching

We used the Creative Self-Efficacy in Teaching scale and the Self-efficacy for Arts Integration scale from past research with similar samples (e.g., Anderson et al., 2021). Four subconstructs of creative mindsets were measured with four items each: (a) General-theory fixed creative mindset thinking about students; (b) General-theory growth creative mindset about students; (c) Self-theory fixed creative mindset about self; and (d) Self-theory growth creative mindset about self. In implicit theory research,

scholars have made important distinctions between the fixed and growth beliefs individuals carry about themselves vs. fixed and growth beliefs about others (De Castella and Byrne, 2015). Those scales and four items for value of creativity for students, have been used in past research with similar samples (Hass et al., 2016; Anderson et al., 2022). Teachers' empathy of creative risk-taking adapted nine items from the cognitive empathy dimension of the Basic Empathy Scale for adults (Carré et al., 2013). Teachers were first given this prompt: *Think about when your students are facing uncertainty in the learning process that demands their creative thinking and attitude*. Two sample items were "I can usually work out quickly when a student is nervous" and "I find it hard to know when my students are frightened to do something that feels risky in class" (counter-indicative). Creative anxiety was measured with four items from the Creative Anxiety Scale (Daker et al., 2019) on a 1–5 frequency scale in line with the STSS. Environmental support for creativity was assessed using 4 items from an extant scale used in past research (Anderson and Pitts, 2017; Anderson et al., 2021). A sample item was "My administration encourages me to foster innovative thinking in my students."

Open-Ended Questions

Teachers responded in paragraph form to open-ended questions in the post-survey, including (a) *how has the makeSPACE experience prepared you to deal with the most important challenges you are facing for the 2020–21 school year? Be as specific as possible;* (b) *What do you feel are your greatest creative strengths as a teacher?* (c) *How are you dealing with the stress of the COVID-19 pandemic and distance learning? How do you plan to support your students through the stress of the pandemic?*

Procedures

Recruitment

The recruitment efforts took place during the April–June 2020 period when schools were shut down due to the COVID-19 pandemic. As such, the sample of teachers who selected to participate were likely already interested and invested in creativity and the arts. Eligibility to participate in the grant-funded project was based on federal requirements (i.e., at least 20% of families with school-aged children in the district lived in poverty).

Professional Development

The makeSPACE Foundation Course for Creative Engagement and the virtual Summer Institute provided teachers a research-based understanding of creativity in teaching and learning through reflective, experiential, and arts integrated instruction and application. Teachers learned and applied a variety of teaching techniques to integrate creative and artistic processes into their instruction and curriculum, starting with brief creative routines. The guiding design principles included making the PD experience: (a) highly engaging and interactive; (b) grounded in current theory and research; (c) scaffolded in challenge and complexity; (d) immediately actionable, adaptable, and relevant to different classroom contexts; and (e) consistently integrated with creative and artistic opportunities and exchange of creative work with peers online. Participating teachers consented to participate in all research activities and agreed to complete the online course material and attend the Summer Institute to receive payment for their time.

Online Learning Materials

The online Foundation Course (depicted in **Figures 2**, **3**) was made up of 12 modules with 1–9 brief lessons per module, taking approximately 18 h to complete in total. Modules included interactive instructional packages with video, narrated slideshows, pop-up interactives, creative exercises, reflective processes, and brief creative assignments. All content was designed, written, and narrated by professional instructional designers with expertise in creativity in education and arts integration. Teachers logged into the online platform and completed the pre-course survey with open-ended and close-ended items prior to starting the course. Project partners sent each participant a sketch journal and a small pack of *metaphor cards* to use in the course, where each card has a clip art image of a common object or scene. **Table 1** describes the focus of the modules and lessons; teachers were required to complete each module to proceed to the next. The course was designed to support teachers with useful mental models, language, examples, and routines for exploring the creative process in teaching and learning. For instance, teachers explored their own personal creative resources (Anderson, 2020)—creative attitudes, creative thinking, and creative behaviors, responding to the question—*How am I creative?*—and creating a metaphorical *creative avatar* collage in their journal (see **Supplementary Appendix** for examples). They photographed their work and uploaded it to the course to share with colleagues and facilitators.

The course content summarized the state of research in education, motivation, creativity, and the arts and applied that research and theory to both personal reflection and immediate integration into teaching and learning. Throughout the course, participants were asked to experiment with key concepts and practices, such as structured uncertainty, metaphorical thinking, divergent idea production, and active reflection. Teachers were prompted to consider their journey through the Foundation Course as if it were a river journey, illustrating how metaphors can be a gateway into creative thinking and meaning-making. For instance, early in the course, teachers were presented with the scenario that they had just begun their river journey only to realize they had forgotten sunscreen. They would need to come up with solutions for how to protect themselves from the hot sun overhead. Participants were encouraged to think of divergent and unusual ideas. Throughout the course, teachers were asked to reflect on their process and the emotions they experienced using different modalities (e.g., writing, sculptural, and gestural). Teachers were able to download protocols to integrate and expand the creative and reflective prompts and routines into their classrooms and content.

Virtual Summer Institute

The 2-day virtual Summer Institute was hosted on Zoom videoconference software and through the learning management system where the foundation course was accessed. The experience

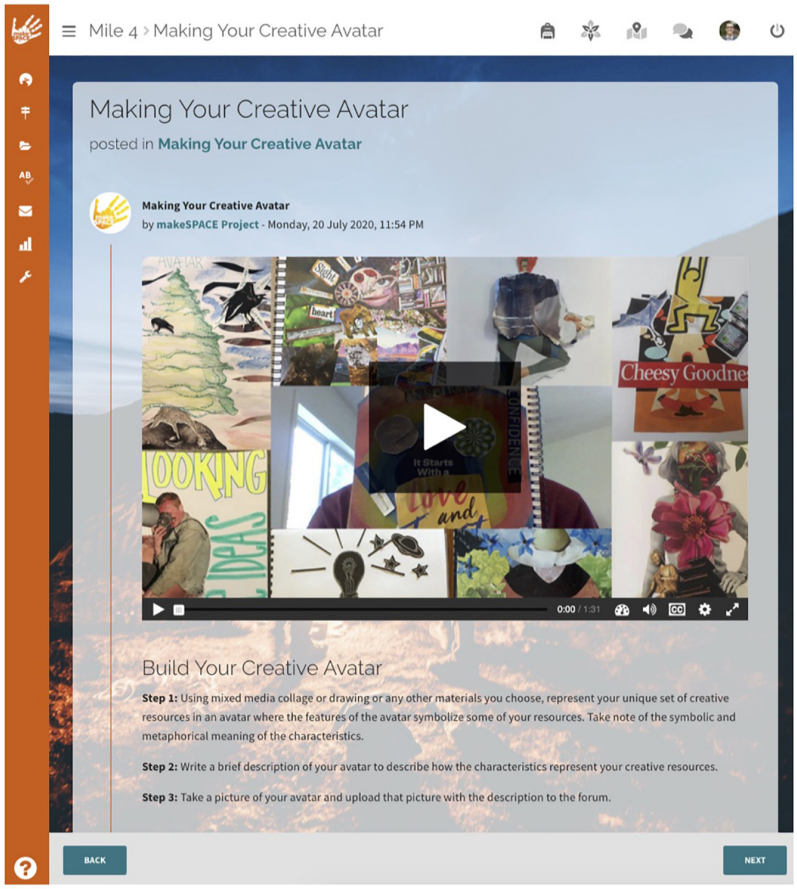

FIGURE 2 | Sample creative and artistic exercise in the online professional development course in creativity and arts integration showing the activity prompt and sharing function.

provided synchronous presentations from facilitators and pre-recorded presentations that participants watched and reflected on through a discussion forum. All participants had access to those discussion forums and could read and respond to their peers' posts. The synchronous and asynchronous activities were hands-on and integrated different creative routines, active reflections, and arts integration strategies that the foundation course introduced. **Figure 4** provides a timeline of participant recruitment, course engagement and completion, and assessments.

Mixed Method Data Analysis

Quantitative Analysis

We used within-subjects analysis of variance (Pedhazur and Schmeklin, 1991) to respond to Research Questions 1 and 2. We report effect sizes, statistics, and Cronbach's alpha internal consistency in **Table 2**. Our study was limited by not having a comparison group; as such, effect sizes would be an important indicator of the robustness of changes detected. We included the within-subject effect size Cohen's d for each statistically significant change detected, where $d = 0.20$ is small, $d = 0.50$ is medium, and $d = 0.80$ is large (Cohen, 1992). We report statistics and Cronbach's alpha internal consistency in **Table 3**. We completed thematic analyses of teachers' open-ended post-training survey responses to address Research Questions 3–5 and understand how those results complemented or contrasted with quantitative findings.

Qualitative Analyses

Well-organized data is key for locating, retrieving, identifying and coding data (Hatch, 2002). In this study, teacher responses to open-ended surveys were compiled in an excel spreadsheet. All teachers provided complete responses to the three open-ended questions. Each response was read and reviewed by three research team members. Typical to mixed methods studies using concurrent designs, responses were coded according to the concepts that were measured in the survey (Creswell and Plano-Clark, 2018). That is, the codes were (a) creative agency, (b) joy, (c) stress management, (d) teaching for creativity, and (e) creative thinking for coding of responses to the questions regarding teacher preparation from the PD and stress management. The codes used for responses to the question about creative strengths included each of the creative agency factors included in **Table 2**. Teacher comments were viewed without identifying names

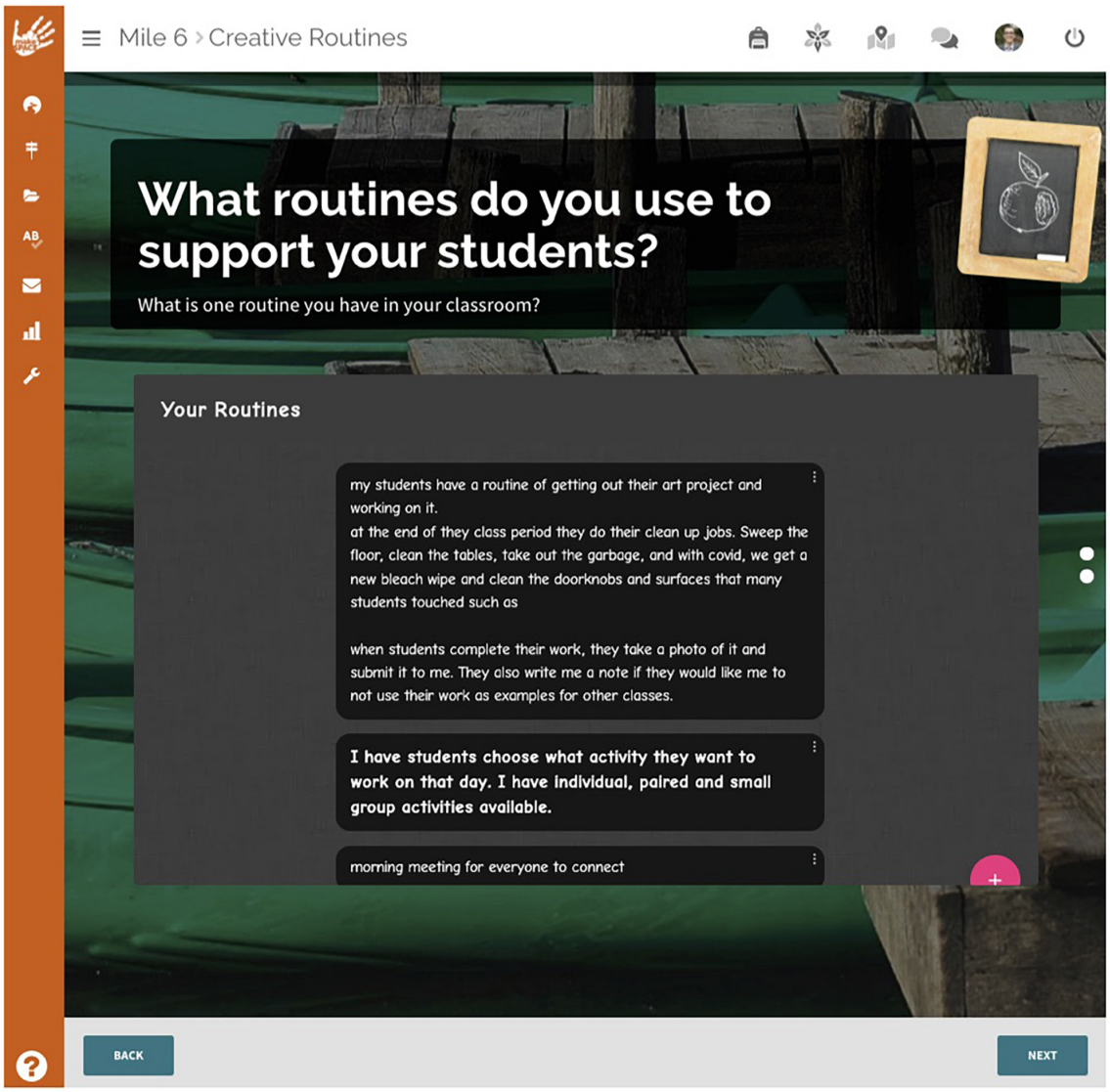

FIGURE 3 | Sample interactive page from online professional development course in creativity and arts integration showing a prompt for teachers to share the routines they use in their classroom.

or information to ensure anonymity. A multi-stage coding process was used to ensure comprehensive coding and structural coherence (Krefting, 1991).

Authenticity

Authenticity, or truthfulness, is an indicator of validity in qualitative research. Given the breadth of responses, and their uniqueness, we interpreted this as a sign of authenticity or validity (Maxwell, 2013). Teachers were encouraged to express themselves authentically in the course and share experiences during the institute, which was palpable in the comments provided in the survey. For example, teachers discussed ways that they were vulnerable in disclosing their weaknesses (like overeating) or relating to students (asking them to describe their anxiety due to COVID-19 each day). In this way, the course fostered conditions conducive to authenticity that resulted in the richness of open-ended responses and indicated a level of trust, rapport, and psychological safety, key to validity. In addition, we attempted to disclose discrepant responses, such as the fixed creative mindset response that ran contrary to the majority of growth creative mindset responses.

Reliability

Coding was conducted collaboratively in multiple rounds to ensure accuracy (Miles et al., 2014). First, the research team discussed the codes, then a member of the team applied the codes. Next, the research team engaged in debriefing and reviewed the first round of coding to discuss the correspondence of the codes to the comments/responses. Adjustments were made to account more holistically for the variety of responses, including the

TABLE 1 | Scope and sequence for makeSPACE foundation course for creative engagement in arts integration—The river journey (metaphor used across the course).

Welcome and orientation	
Mile 1	Lessons: makeSPACE for creativity; Introducing the creative resources
What is creativity? How am I creative?	
Mile 2	Lessons: Creativity through the lens of ourselves and others; Stories of creative risk-taking and growth with arts integration in the classroom; Reflecting on the development of personal creative resources
Mile 3	Lessons: Teachers as artists of pedagogy
Mile 4	Lessons: How are you creative? Creative resources as teaching tools; Making your creative avatar
How do I makeSPACE for creativity?	
Mile 5	Lessons: Conditions for creative engagement; Flow stories; Meaning-making through creative engagement; Patterns; Cultivating conditions and planning for creative engagement
Mile 6	Lessons: Creative routines; Routines and intentions; Why creative routines? Vocabulary gesture reflection; Many uses game and reflection; 10-min routines; Implementation idea; Choose a routine
What is arts integration?	
Mile 7	Lessons: Role of artistic practice; Skills and sensibilities; Art is a verb! Learning through the arts; Treasure hunt; Still life
Mile 8	Lessons: What is arts integration? Tools for integration
How do I begin to integrate?	
Mile 9	Lessons: Arts integration: How? Refining intentions and review; Designing for quality arts integration; When you integrate the arts. . . ; Core practices; Share your avatar; Which routine did you practice?
Mile 10	Lessons: Metaphorical thinking; Metaphor hunting; A metaphor for the self; Metaphor gestures and homework
Mile 11	Lessons: Reflective practices; Why reflection? Your selfie; Reflective routines; Metaphor card reflection; Opportunities to reflect; Notice. . . ; Share your reflections
Final stretch	
Mile 12	Lessons: Braided channel; Portage; Entering the delta; Share the experience you designed; The take-out; Congratulations

addition of the code "no effect" to identify teachers who expressed that the PD was not relevant or effective for them. Then, a second round of coding occurred. Finally, the codes were reviewed by another team member. In the final phase, the comments were copied and pasted from the excel spreadsheet and organized by individual code under each open-ended question in a word document. The codes were then synthesized and described in a narrative manner to account for them comprehensively. *In vivo* expressions were selected based on exemplifying the codes. In some cases, multiple themes that emerged were organized in a table to help illustrate the broad representation of perspectives provided by teachers.

RESULTS

Overall, results mostly supported the theoretical framework linking reduced stress and enhanced wellbeing with increased creative agency as a result of the blended makeSPACE PD. No change from pre- to post-survey was detected in general positive or negative affect and creative anxiety. Change was detected in all other aspects of creative agency and wellbeing. Ninety-six percent of teachers, or 51 out of 53, responded with positive reflections about how the PD experience enhanced their capacity to manage the challenges of the pandemic. The range of responses illustrated how teachers personalized the experience to support them best.

Quantitative Results for Teachers' Creative Agency

All measured factors of teachers' creative agency improved (see **Table 2** for statistics), except for creative anxiety. Creative self-efficacy in teaching increased at a large effect size, $F(1, 52) = 24.76$, $p < 0.05$. Self-efficacy for arts integration increased at a very large effect size, $F(1, 53) = 93.30$, $p < 0.05$. Fixed creative mindset about oneself (self-theory) decreased at a medium effect size, $F(1, 52) = 8.25$, $p < 0.05$. Fixed creative mindsets about students (general theory) decreased at medium-to-large effect size, $F(1, 53) = 15.48$, $p < 0.05$. Teachers growth creative mindset about themselves increased at a medium effect size, $F(1, 53) = 13.88$, $p < 0.05$. Growth creative mindset about students increased at a large effect size, $F(1, 53) = 23.30$, $p < 0.05$. Teachers' perceived value of creativity for students increased at a medium effect size, $F(1, 53) = 14.43$, $p < 0.05$. Creative anxiety did not change at a statistically significant level. Cognitive empathy for creative risk-taking increased at a medium effect size, $F(1, 52) = 14.70$, $p < 0.05$. Teachers' perceived environmental support for creativity in their school increased at a small-to-medium effect size $F(1, 52) = 4.37$, $p < 0.05$.

Quantitative Results for Teacher Wellbeing

General positive and negative affect did not change at a statistically significant level, but other factors of teacher wellbeing did appear to improve (see **Table 3** for statistics). Teachers' secondary traumatic stress decreased at a small-to-medium effect size, $F(1, 52) = 9.76$, $p < 0.05$. Dispositional joy of teachers increased at a medium effect size, $F(1, 52) = 29.15$, $p < 0.05$. Teachers' resilience increased at a small effect size, $F(1, 52) = 5.16$, $p < 0.05$. Within teachers' STS, the subfactor of avoidance demonstrated the largest decrease at a medium effect size, $F(1, 52) = 12.67$, $p < 0.05$. The subfactor of intrusion demonstrated a small-to-medium effect size decrease at $F(1, 52) = 7.39$, $p < 0.05$. The subfactor of arousal did not change at a statistically significant level, though appeared to reach a small effect size decrease.

Descriptive Qualitative Results About Teacher Experience

The qualitative results are reported according to each open-ended survey question in terms of how they perceived the professional development experience, coping with the stress of the pandemic and teaching, and their creative strengths and definitions of creativity. To bring the data to life, we reported the results with a "lush" level of detail, appropriate for qualitative writing (Tracy, 2013).

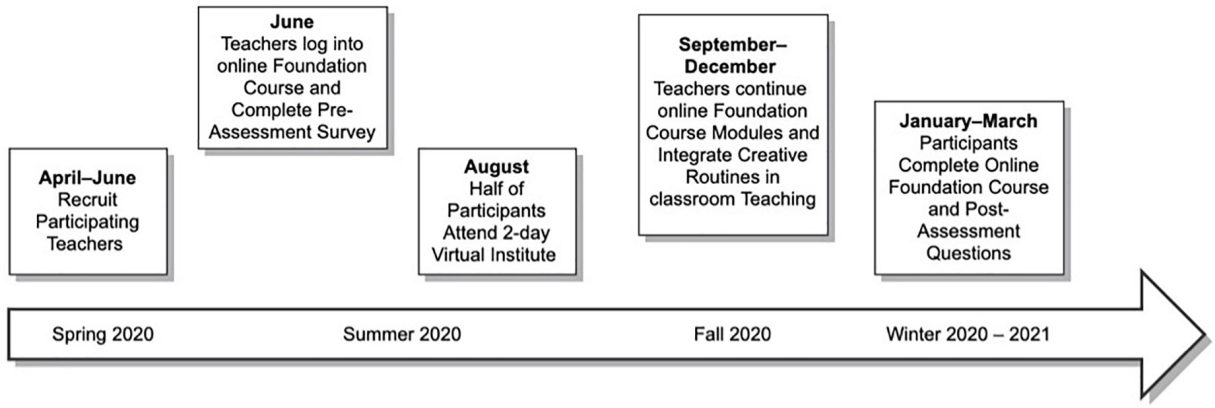

FIGURE 4 | Timeline of participant recruitment, course engagement and completion, and assessments.

TABLE 2 | Results of within-teacher ANOVA for perceptions, beliefs, and affect related to creative agency in teaching.

Teacher perceptions	Period	∝	Mean (SD)	*p*-value	Cohen's *d*
Creative self-efficacy in teaching	Pre-test	0.79	4.33 (0.65)	0.000	0.81
	Post-test	0.75	4.80 (0.51)*		
Self-efficacy for arts integration	Pre-test	0.90	2.87 (1.19)	0.000	1.74
	Post-test	0.85	4.55 (0.70)*		
Fixed creative mindset about students	Pre-test	0.77	1.40 (0.47)	0.000	0.69
	Post-test	0.81	1.14 (0.27)*		
Growth creative mindset about students	Pre-test	0.83	5.20 (0.66)	0.000	0.79
	Post-test	0.80	5.66 (0.49)*		
Fixed creative mindset about self (teachers)	Pre-test	0.88	1.74 (0.78)	0.003	0.47
	Post-test	0.86	1.48 (0.55)*		
Growth creative mindset about self (teachers)	Pre-test	0.93	5.40 (0.66)	0.003	0.58
	Post-test	0.83	5.72 (0.41)*		
Value of creativity for students	Pre-test	0.86	4.96 (0.74)	0.001	0.59
	Post-test	0.85	5.35 (0.57)*		
Creative anxiety	Pre-test	0.83	2.15 (0.73)	0.54	0.05
	Post-test	0.86	2.23 (0.79)		
Cognitive empathy for creative risk-taking	Pre-test	0.74	4.62 (0.51)	0.000	0.47
	Post-test	0.82	4.86 (0.52)*		
Environmental support for creativity (school)	Pre-test	0.82	3.88 (0.91)	0.042	0.27
	Post-test	0.82	4.12 (0.90)*		

**Denotes statistical significance between pre-test and post-test at $p < 0.05$ or lower. ∝ denotes Cronbach's alpha internal consistency. Effect size index: d = 0.20 is small, d = 0.50 is medium, and d = 0.80 is large (Cohen, 1992).*

From Dry to Engaging Curriculum: The Impact of the Professional Development on Teaching and Life

When asked, "How has the makeSPACE experience prepared you to deal with the most important challenges you are facing for the 2020–2021 school year? Be as specific as possible," teachers described a variety of ways they transformed their courses from dry and rote material to more engaging curriculum. Many discussed how they developed creative agency and referred to the enjoyment gleaned from the online course and virtual institutes, implementing the practices in their life and work, and shifting their perspective on priorities and possibilities in the classroom. **Table 4** illustrates the sub-themes within each code. Overall, teachers emphasized the process of engagement with their students in a new light as a result of their immersion in the PD. For instance, one teacher stated:

> The [PD] experience reminded me that standards live in the backseat, teachers sit in the passenger seat, and students sit in the driver's seat. The experience has given me the confidence to try creative practices daily and to give students more choice in their own learning.

Learning from mistakes and being "open to try new things" was mentioned as a way to take risks and grow—a foundation of teacher creativity. Making stronger connections to students was also central. In turn, many teachers indicated that the combination of transforming their curriculum and building

TABLE 3 | Results of within-teacher ANOVA for aspects of teacher wellbeing.

Teacher perceptions	Period	∝	Mean (*SD*)	*p*-value	Cohen's *d*
Positive affect in teaching	Pre-test	0.88	3.74 (0.64)	0.258	0.15
	Post-test	0.86	3.64 (0.66)		
Negative affect in teaching	Pre-test	0.84	2.48 (0.82)	0.751	0.04
	Post-test	0.86	2.45 (0.78)		
Buoyancy in teaching	Pre-test	0.93	3.83 (1.02)	0.027	0.26
	Post-test	0.90	4.08 (0.89)*		
Dispositional joy	Pre-test	0.93	4.38 (0.86)	0.000	0.58
	Post-test	0.92	4.80 (0.72)*		
Secondary traumatic stress (STS)	Pre-test	0.93	2.51 (0.85)	0.007	0.39
	Post-test	0.87	2.22 (0.62)*		
STS intrusion sub-factor	Pre-test	0.81	2.54 (0.92)	0.009	0.33
	Post-test	0.61	2.27 (0.65)*		
STS avoidance sub-factor	Pre-test	0.78	2.40 (0.83)	0.001	0.44
	Post-test	0.75	2.07 (0.66)*		
STS arousal sub-factor	Pre-test	0.89	2.62 (1.03)	0.072	0.24
	Post-test	0.76	2.40 (0.82)		

**Denotes statistical significance between pre-test and post-test at $p < 0.05$ or lower. ∝ denotes Cronbach's alpha internal consistency. Effect size index: d = 0.20 is small, d = 0.50 is medium, and d = 0.80 is large (Cohen, 1992).*

TABLE 4 | Emergent sub-themes about teachers' preparation from PD experience.

Code	Sub-theme	Representative quotes
Creative agency	Confidence to try new things and take risks Not worrying about mistakes Opened my mind To be real with students Challenged me to connect with students Pushed out of comfort zone Pushed me to be creative with solutions Getting creative ideas from others	*"Honestly, the tools gained from the class give me confidence to try new things. I'm an old dog and needed some new tactics to support learning of all kids in my classroom."* *"I love the fact that I can help them express their thoughts without having to come up with the words."* *"It has helped me feel re-invigorated to create interesting lessons when I would have otherwise felt in a rut."*
Joy	Finding joy in trying new things Make time for passion projects Connecting with students through metaphor Collaborating with other teachers Quiet joy doing hands-on creative work Reminded me of what I love most	*"It has encouraged me to make my own creative space wherever it is that I'm working from. . . "* *"I feel like the experience reinvigorated my desire to teach under these circumstances. It seemed pretty hopeless in the spring, and now I feel like I have more tools in my tool belt. . . "*
Stress management	Experience the peace and release of making art Being creative to deal with adversity Slowing down rather than pushing to point of being overwhelmed	*"I am using all of the self care techniques (meditation, journaling, giving myself time to draw) that we used in the course and in the institute."*
Teaching for creativity	Transforming rote curriculum "Shaking up" distance learning experience for students New creative lessons and routines Using reflective practices and metaphor Ideas for how to start the school year	*"I feel much more capable of transforming a dry and rote curriculum into something more engaging through the use of creative activities."* *"This year I have asked my students to be more creative and metaphorical in their learning. I have been promoting risk-taking because, why not, we are in a pandemic anyway!"*
Creative thinking	More to school than simply academics Powerful tools to unpack emotions differently (gesture, sound, imagery) Kids are burnt out and need creativity in daily learning	*"An ongoing challenge in science education. . . is to focus on higher level thinking and less on facts/information. MakeSPACE provided some very concrete ways to engage in higher level thinking that will be manageable through distance learning."*

better relationships with students reinvigorated their teaching practice. Making art and doing creative activities was considered key to good teaching, to integrate education with the arts and creativity, and to finding some peace and release. Different teachers emphasized different benefits; some focused on their own creative development and others reflected on reduced stress and enhanced enjoyment or the benefit of creative learning for their students. As **Table 4** illustrates, a range of multiple sub-themes emerged from each code, suggesting a personalization of the PD experience to suit the unique assets, needs, challenges, and contexts of each teacher.

In addition to the positive comments, two teachers did express a neutral response to the experience: "Honestly, it hasn't' helped in any specific ways. It was a nice time, but not very applicable to

my situation." As well, some teachers remarked that their level of stress due to teaching during the pandemic impacted their ability to see connections between the course and how they will teach in the future. Importantly, those contributions suggest validity that teachers were candid and direct in their responses.

Being "Shelters in the Storm" for Students and Other Approaches to Coping

When asked, "How are you dealing with the stress of the COVID-19 pandemic and distance learning? How do you plan to support your students through the stress of the pandemic and distance learning?" teachers discussed both positive and negative responses while maintaining a realistic approach and pointing toward types of activities to reduce stress.

Being "shelters in the storm" and serving as a "reliable presence" was identified as a strategy to cope with the stress of teaching during the pandemic. Several teachers focused on strategies to cultivate a positive and supportive environment for students. For example, teachers mentioned the importance of flexibility and helping students to engage actively in the process of reflecting on achievable goals. Teachers tried to invoke their love of teaching to offset the stressor of coping with the pandemic. Being there for students helped boost their commitment as evidenced in the comment, "I am concentrating on being a reliable presence in my Students' lives." Other teachers saw teaching in the pandemic as an opportunity to emphasize the value of learning: "I am. . .hoping students will look at this with a new vision of being grateful for having school and being with others."

Challenging aspects of teaching online included focusing on the present moment, and not dwelling on the uncertainty of the pandemic and its effects. The difficulty of reacting to constant change was referenced as a barrier to teaching online. The public's eroding trust in science to address the pandemic was also noted by teachers, especially those who had family members considered at high-risk for being vulnerable to the transmission of COVID-19. For example, one teacher stated:

> I find I do not trust the people in charge. I do not trust our leaders to make sane decisions based on science. That stresses me out to no end. However, since I can't control any of that, I have focused on creating fun projects for my art students, and delivering the information in the best possible way. I am adjusting constantly because I am always learning new things on the computer, and learning to be more efficient and creative with the tools.

Activities for coping with these steep challenges included self-care, engaging in creative activities like drawing or knitting, and being physically active. Other habits such as over-eating were mentioned. Family activities were a huge theme for coping with the stress of COVID. Additional time spent with children and family members was perceived as a big benefit of working from home.

Teachers also discussed integrating social-emotional skills into their teaching, like listening to students, using more open communication, being transparent about the COVID crisis and allowing students to express their feelings even if it included discussing personal anxiety. Teachers innovated with how they attempted to encourage students to stick with learning online, like using meditation. For example, one teacher said:

> I mail positive notes home to my students. I also send them little packages with surprise stickers and notes and cut out shapes. I schedule one-on-one Google Meet sessions where I give them all my attention as they read to me. They are unmuted the entire time.

Teachers reported multiple innovations that arose in proactive and agentic support of students to deal with the challenges of the pandemic, especially to connect with students, support them through their stress, and manage their own compassion fatigue.

"Thinking on the Fly" and Other Creative Strengths

In response to the question, "What do you feel are your greatest creative strengths as a teacher?" teachers discussed several topics such as their own creative self-efficacy, creative growth mindset, the value of creativity, shaping an environment for supporting creativity, and actively using empathy with others.

Overall, teachers remarked how creative they felt psychologically in terms of coming up with new ideas such as "thinking on the fly" as a teacher. Teachers emphasized the need to adapt, change and explain concepts in new ways as a chief source of creativity. To one teacher, this included taking divergent ideas and integrating them into a lesson. The concept of making mistakes, and even owning up to them, was part of thinking on the fly. The association of professional growth to creativity revealed an emphasis on a growth creative mindset, "My ability to stretch and adapt to whatever is thrown to me." Pivoting and trying new things also characterized a growth mindset about creativity. Teachers humbly noted that they might not have all the answers, but were willing to let students fail and accept and recognize their own failings as a model. This perspective shows empathy with students' learning process. Notwithstanding the majority of creative growth mindset comments, one teacher did comment they did not think of themselves as amazing but "capable enough to demonstrate" creative projects to students.

In addition to their own creativity, teachers commented on their creativity in integrating the arts into the classroom and developing new projects for students. Although comments about teaching in a creative manner were common, the style and approach to speaking with students was mentioned several times as a feature of teacher creativity. For example, one teacher emphasized "word play" while another teacher included empathy in the way they taught to include creativity. Another teacher exclaimed:

> Everything in teaching takes creativity: making the lessons, delivering the instructions, working with students. Communication takes creativity! How can I deal with this difficult situation with compassion and kindness? That is a question I ask myself each day, many times. It takes creativity to find an answer.

Communicating one's creative ideas to colleagues in addition to students was important to teachers. As a result, empathy-driven relationships were at the core of teacher comments on their creative strengths. Teamwork, collaboration and references to the familial nature of working with co-workers were all important.

Integrating Mixed Method Findings

Quantitative results provided promising evidence for the PD's effectiveness to contribute to the development of teacher creative agency and important aspects of their wellbeing in teaching. The effect sizes were generally substantial in size. Without a comparison group of teachers it was necessary to conduct follow-up analyses to understand if the changes detected could be reasonably attributed, to some degree, to the PD experience. Qualitative findings described teachers' unique creative and agentic development to manage the challenges of the pandemic, reinvigorate enjoyment and engagement in teaching, and shift teachers' perspectives and priorities. Their extensive and personalized responses provide additional confidence that the PD experience contributed to the changes detected in the quantitative results.

DISCUSSION

The results from this study focus attention on two aspects of teacher support and development—creativity and wellbeing—that have not received the attention that conditions of the teaching profession warrant. These aspects of teacher support are especially important in light of the ongoing COVID-19 pandemic and the secondary traumatic stress they inevitably experience. The results provide some promising evidence for the PD approach described to support teachers' creative agency, wellbeing, and actual adaptability in the classroom. Generally, most measured factors in the quantitative analyses demonstrated substantial positive change. The lack of change detected in general positive or negative affect and creative anxiety could have been the result of mounting challenges teachers experienced across the 2020–2021 school year of COVID-19 school shutdown. The improvements in factors of wellbeing are noteworthy given the fact that job-related stress and depression increased for teachers, nationally, at 2–3 times the rate of the general adult population during the timeframe of this study (Steiner and Woo, 2021). The qualitative results added description and detail to the ways teachers applied what they learned in the PD and the role of that experience in remaining positive and proactive during the traumatic disruption of the pandemic for themselves and their students.

Results demonstrated that an online PD experience can support the development of teachers' creative agency in the classroom, replicating some of the results from a pre-pandemic study (Anderson et al., 2022) and adding effects on wellbeing outcomes. Results differed in some ways from that past study, suggesting the sample in this current study may have entered into the program with stronger creative agency. For instance, fixed creative mindsets were substantially lower at the pre-assessment stage and creative anxiety started off lower for this sample of teachers, as well. Though the sample is too small to conduct more sophisticated modeling, results suggest the self-beliefs, mindset, empathy, and affect that form a teachers' creative agency may be a catalyst for enhanced joy and reduced stress during challenging times. These findings are noteworthy given the lack of attention to creativity in the field of teacher preparation and professional development (Anderson et al., 2021), and the impact of STS on teachers working with marginalized students (Hydon et al., 2015).

Connecting Teacher Creativity and Stress Management

The state of teacher engagement, sustainability, and wellbeing was alarming even before the pandemic (American Federation of Teachers, 2017), and has only worsened since. In the two decades leading up to the COVID-19 pandemic, school conditions for teachers across the country set the stage for secondary trauma—high rates of violence experience by students outside of school as well as high rates of violence and bullying inside of schools (Hydon et al., 2015). And yet, attention from the U.S. Department of Education and the education research community is still in its infancy (Lucas, 2007; Alisic, 2012; U.S. Department of Education, Office of Safe and Healthy Students and U.S. Department of Health and Human Services, 2012). The results of this study raise awareness of the state of secondary traumatic stress in teaching and illustrate how teachers' creative agency in this demanding profession may serve as a protective factor.

Follow-up analyses found the biggest decrease in teachers' STS to be in the area of teachers' avoidance. Avoidance subscale items included feeling emotionally numb, discouraged about the future, little interest in being around others, less active, and avoiding students or reminders about work. According to teachers' open-ended responses, their experience in the PD gave them new ways to be creatively active in their non-work life and new ways to make their engagement with students more enjoyable and to deepen relationships. The decrease in intrusive stressful feelings and thoughts may have also been related to teachers' engagement in creative activities inside and outside the classroom. More research to understand this process in depth and across time for different teachers could provide new insights on how to support teachers through their experience of STS and how to optimize the benefits of creative and artistic practice. Perhaps the most important point from the qualitative analyses is the wide range of ways that teachers personalized the PD experience to manage the stress and disruption and support their students best. PD and programming that is overly prescriptive may be less effective and relevant to the varying contexts of teachers' lives and work.

The Social Side of Teachers' Creative Agency

It is possible that supporting teachers' creative agency as a fundamental necessity for their wellbeing can help to address the issue of their sustained engagement in the profession. The late Bandura (2018) conceptualized the personal agency that we develop through our own experience and the proxy agency

we experience vicariously from others as fundamental building-blocks to our motivation and behavior in life. That agency may be just as important for the creative aspect of teachers' professional growth as any of the technical training they receive. As Bandura theorized, agency does not develop and sustain for individuals in isolation from others; developing a sense of agency is a social process (Bandura, 2018). Several teachers felt buoyed by the contributions from and connections with other teachers. Moreover, on average, teachers reported feeling more support for creativity in their school after their PD experience, even though they were largely all teaching their students online, either from empty classrooms or from home. Perhaps the connections they made with others teachers inside and outside their school had a carryover effect.

Based on the integration of mixed method results, teachers in this study appeared to thrive within the professional learning community that formed by teachers taking risks to share their ideas for the integration of creative teaching and learning in the classroom and their own creative and artistic work produced throughout the PD. The course required them to give and receive feedback, often with peers they had never met in person. For instance, they recorded and uploaded video of themselves imagining and sharing gestural metaphor exercises to illustrate their understanding of the theory behind the concept, *creative engagement*. Those scaffolded experiences seemed to develop a stronger creative agency reflected in teachers' average increase in agentic factors and in the variety of qualitative responses provided. The links between teachers creative development and enjoyment of their work is clear within the themes that emerged. This kind of collaborative professional learning experience may have been especially powerful give the intense isolation teachers survived during the 2020–2021 school year. How teacher isolation contributes to teachers' growing demoralization (Santoro, 2019) should be an area of further exploration. Offering more opportunities for playful creativity with colleagues within and across communities should be a focus for future supports in the profession.

Future Directions to Develop Teacher Creativity, Agency, and Wellbeing

Online and blended training has been increasing as a viable method to develop teachers' skill, resilience, and wellbeing in their work across the education field (Fishman et al., 2013). The BRiTE project provides an example specifically focused on teacher resilience using a completely self-paced and individualized online experience. As Mansfield et al. (2021) describe, the BRiTE PD experience uses an online platform to provide teachers new understanding about resilience, how it shapes in people, the kind of personal and interpersonal resources, skills, and choices that support and sustain resilience, optimism, motivation, and engagement in teaching. The BRiTE approach shares many similarities with the online makeSPACE approach, such as personalized pathways, expert tips, interactive activities, simulations and practices, and a toolkit of practices that teachers can retrieve and integrate into their work and life. In fact, the module design principles from both approaches are nearly parallel: (a) personalized, (b) interactive, (c) authentically connected to the profession, and (d) informed by the literature. The commonalities of these two approaches potentially provide the field of education new pathways to consider in reaching the goal of a teacher force that is resilient, creative, and prepared to thrive in the uncertainty and stressors of the post-pandemic world. However, a major difference between the two approaches is in the level of interaction offered with other participants. More research is needed to compare the development of teacher agency in fully self-paced and self-contained online training compared to training experiences in an interactive cohort with others.

The framework of creative agency for teachers centers on the agentic and creative demands of the teaching profession and on the research-based characteristics of learning environments that cultivate students' creative engagement in learning—their autonomy, belonging, creative potential, and sense of competency in school (see Anderson, 2018). If teachers develop creative agency within a supportive school environment, students are more likely to experience the modeling, messaging, and creative learning that will build their own creative adaptiveness and resilience in the face of increasing uncertainty about the future.

Limitations

The results of this study are preliminary given the small sample, the lack of a comparison group, and the extraordinary circumstances of the COVID-19 pandemic. The sample size limits the ability to conduct more complex statistical models, such as mediation of the creative self-beliefs on change in stress. Due to the stress of distance learning and other aspects of the pandemic, some teachers dropped out of the PD early on, indicating they could not fit the additional work into their lives. The lack of a comparison group limits our understanding about where this sample of teachers began and what natural development of creative agency and wellbeing may have happened during the pandemic. The fact that stress reduced and joy and resilience increased for this sample contrasts with the worsening national trends for teachers mentioned earlier during this same timeframe.

CONCLUSION

The framework of creative agency for teachers investigated in this study could provide an important approach to optimize a new pathway for ongoing teacher PD and support during a period of increasing uncertainty and stress in the profession. The accessible and scalable PD approach illustrated in this study provides one example for reaching that goal. Teachers' creative agency may be foundational to sustained adaptability, wellbeing, and commitment in this valuable profession, especially amidst the disruption of global pandemics, violent natural disasters, and mounting political conflict. Adaptable teachers embodying and modeling creative agency is likely a key factor for the development of these important strengths to prepare students to be agentic in their own futures.

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 IntegReview. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

RA led the design and development of the study, the theoretical framework development, and all aspects of writing, including contributions in the qualitative analysis, and write-up. JK-B led the qualitative analysis and write-up and review and revision of the entire draft. ML, JL, and NB led the development of the professional development program in alignment to the theoretical framework. TB contributed to the research design and the larger study development. GS contributed to the organization and implementation of the qualitative analyses. All 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/feduc.2022.848005/full#supplementary-material

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Programmatic Assessment in a Virtual Learning Environment: Supporting Faculty Engagement for a Successful Quality Assurance System

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Quality P-12 student learning begins with quality educator preparation. An integral part of ensuring quality academic programs is ongoing programmatic assessment. Faculty and administrators tasked with overseeing the assessment processes in higher education institutions were faced with an added challenge during the COVID-19 pandemic when campuses across the country pivoted to virtual and hybrid learning. This transition not only meant that faculty and students were now teaching and learning in an online environment, but it also meant that assessment coordinators needed to find new ways to keep their quality assurance system operating well, while working in a pandemic, or post-pandemic reality. This chapter details how one assessment coordinator navigated the challenges and successes of supporting faculty engagement in a fully online programmatic assessment process in a college of education and human services in a private university in the northeast.

Keywords: assessment and education, accreditation, faculty engagement, virtual learning and education environment (VLE), higher education, teacher education and development

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INTRODUCTION

Many factors contribute to successful P-12 student learning. Teachers, and how they are trained to teach, are an essential piece of the equation when looking at how today's students are learning (Cochran-Smith et al., 2020). Higher education plays a crucial role in the educational system by designing and delivering academic programs to prepare our future teachers and school leaders for their roles in classrooms and schools. It is my perspective that to do this important work of training our future educators well, higher education must engage in a continuous cycle of ongoing accreditation, assessment and program evaluation of its educator preparation programs. The pandemic brought new complications to our ability to assess the quality of our teacher preparation programs, as well as some unexpected benefits and improvements to our processes.

Ongoing assessment of student learning and academic program effectiveness takes organization, consistency, and time, to improve candidate performance and program outcomes. With this chapter, I share my experience in my role as assessment coordinator for a college of education

and human services, and how I engaged with our faculty and administrative staff for effective assessment processes in a virtual environment. The chapter will examine the challenges of working with faculty on program assessment in an online format, as well as some of the unexpected benefits that ultimately helped us to create a highly functioning and collaborative assessment system.

I will begin with a look at the national standards for educator preparation, and whether they are reasonable given the shift to virtual and hybrid learning in the past year. I will outline the meeting structures I developed to support faculty engagement with assessment, such as monthly committee meetings and bi-annual faculty assessment retreat, and the challenges and unexpected benefits of the virtual format.

Included in this review will be examples of successful data sharing for internal use and for public facing accountability, as well as involving our school partners through online advisory committee meetings. Examples of program improvements based on data shared virtually will be provided.

Integral to program assessment work is attention to data quality. I will describe our process for achieving validity and reliability virtually, and innovative practices we tried for improving response rate and data quality such as creating a study group and targeted outreach of our alumni and employers. I will revisit the accreditation demands on educator preparation, by describing our virtual site visit and how we used the online format as a strength for encouraging participation from external stakeholders.

I conclude with my perspective on the importance and personal socio-emotional value of online professional networking for assessment coordinators, in support of successful assessment processes that help ensure quality educator preparation for our future teachers and school leaders.

NATIONAL STANDARDS FOR EDUCATOR PREPARATION

Educator preparation programs in the United States must report to multiple sets of standards, and this requirement did not waver during the COVID-19 pandemic. The Council for Higher Education Accreditation (CHEA) oversees accreditation for institutions of higher education, as well as recognition of the program-specific accreditors. Educator preparation programs currently have two choices. There is the Council for the Accreditation of Educator Preparation (CAEP), recognized by CHEA in 2014, and the Association for Accreditation of Quality Educator Preparation (AAQEP), recognized by CHEA in 2021. Both accreditors base their standards, mission, and vision on a philosophy of continuous review and improvement of educator preparation programs. The focus of this article is on an experience with CAEP standards, as AAQEP has only recently become an option.

Early in the pandemic, in-person learning became scarce as P-12 schools and higher education programs alike shut down their physical buildings. For an educator preparation program, this raised questions about whether the demands by CAEP were reasonable given this shift to virtual format. Although many faculty and administrators expressed anxiety over meeting the CAEP standards during the pivot to virtual learning, I would argue that the standards were in fact reasonable and provided enough flexibility to be met even during a temporary shift to fully online teaching and learning. The shift meant that we needed to review the national CAEP standards, to be sure that we would be positioned to address them.

Council for the Accreditation of Educator Preparation defines their 2022 Revised Initial Standards[1] as follows:

Standard 1: Content and Pedagogical Knowledge

The provider ensures that candidates develop an understanding of the critical concepts and principles of their discipline and facilitates candidates' reflection of their personal biases to increase their understanding and practice of equity, diversity, and inclusion. The provider is intentional in the development of their curriculum and clinical experiences for candidates to demonstrate their ability to effectively work with diverse P-12 students and their families.

Standard 2: Clinical Partnerships and Practice

The provider ensures effective partnerships and high-quality clinical practice are central to candidate preparation. These experiences should be designed to develop a candidate's knowledge, skills, and professional dispositions to demonstrate positive impact on diverse students' learning and development. High quality clinical practice offers candidates experiences in different settings and modalities, as well as with diverse P-12 students, schools, families, and communities. Partners share responsibility to identify and address real problems of practice candidates experience in their engagement with P-12 students.

Standard 3: Candidate Recruitment, Progression, and Support

The provider demonstrates the quality of candidates is a continuous and purposeful focus from recruitment through completion. The provider demonstrates that development of candidate quality is the goal of educator preparation and that the EPP provides supports services (such as advising, remediation, and mentoring) in all phases of the program so candidates will be successful.

Standard 4: Program Impact

The provider demonstrates the effectiveness of its completers' instruction on P-12 student learning and development, and completer and employer satisfaction with the relevance and effectiveness of preparation.

Standard 5: Quality Assurance System and Continuous Improvement

The provider maintains a quality assurance system that consists of valid data from multiple measures and supports continuous

[1] http://caepnet.org/standards

improvement that is sustained and evidence-based. The system is developed and maintained with input from internal and external stakeholders. The provider uses the results of inquiry and data collection to establish priorities, enhance program elements, and highlight innovations.

After close consideration, we concluded that CAEP's standards for educator preparation are not hinged on in-person learning, or in-person administrative meetings. In my role as assessment coordinator, I found this fact to be quite helpful, as it gave me leverage to convene faculty for our regular data reviews, which empowered me to explore new technologies. We jumped into new options such as Microsoft Teams virtual meetings and online chat functions, although not fully confident, we were knowledgeable enough to get started.

MEETING STRUCTURES FOR QUALITY ASSURANCE

It has been my experience that assessment work in higher education has the greatest impact when it is done in collaboration with the faculty members. This has held true, even in the virtual environment. To support faculty engagement with assessment, I rely on meeting structures such as monthly CAEP Committee meetings and our bi-annual faculty assessment retreat. These organizational structures help facilitate data discussions and set the expectation that assessment and accreditation are a shared endeavor for us to participate in together.

Our CAEP Committee is composed of program directors of each of our CAEP accredited programs, our assessment administrator, and me as facilitator. By having regularly scheduled meetings on the calendar, the message is clear that we will be engaging in data informed discussions on a regular basis. This group serves as a resource for my work as an administrator, and it also supports the program directors in their own professional development in becoming more comfortable with interpreting data and understanding accreditation standards.

With the pandemic, the meetings have shifted to be completely online. This meant that the regular meeting structures that were put into place on the academic calendar, kept their place and instead shifted to Microsoft Teams. These meetings are integral to data sharing and assessment, so I was determined to keep the pace even with the new platform. These meeting structures provide regular feedback loops for faculty to review data for program improvements. What was unexpected was that the new format supported even stronger democratic meeting structures, by enabling wider participation. Those who may have had family, teaching, or commuting conflicts were often now able to login from their home. This also meant that faculty teaching in our online School Counseling program who live out of state, were able to attend without traveling to campus once a month.

In these meetings, faculty and staff are given updates on our collective accreditation timeline leading to our next report, as well as reminders for the annual calendar of data collection and analysis. Data can come in the form of completer, alumni, and employer surveys, course embedded rubrics, clinical placement evaluations, and any number of other formats.

DATA QUALITY

A requirement of CAEP accreditation is that all assessments must achieve validity and inter-rater reliability. Keeping track of validity and reliability studies for multiple programs can be an overwhelming task depending on how many teacher preparation programs are offered by a college or university. Any time there are substantive revisions to an assessment tool, the process must start all over again, with a validity study first, and a reliability study after that.

Pre-pandemic, our approach had been to engage faculty and school partners at in-person meetings to conduct this work. Our most common choice was to use an advisory committee meeting or a department meeting, where we would distribute paper copies of an assessment, accompanied by a printed questionnaire to be completed in real time during the meeting. Working together in-person created casual opportunities to learn from each other. For example, if someone raised a question, the other participants would hear the response which helped raise awareness for the whole group. This format created a situation in which the teaching and learning was shared among the participants of the validity study, which elevated and highlighted the expertise each of us brought to our work. Face-to-face interaction presented a welcome break from the usual routine, with a more relaxed atmosphere, and allowed us to come together as a community to have a shared experience.

With in-person meetings no longer an option for the time being, I had no choice but to shift the process to a virtual format. I converted our paper forms to a Qualtrics survey, worked with our program directors to develop contact lists of qualified individuals for each assessment and hoped for the best. My original plan was to conduct a minimum of one or two studies per program, per semester, but I was not sure we would be able to accomplish this without our tried and true in-person meetings.

A few unexpected outcomes came out of this initial approach. At first it seemed to be a great opportunity to tap into a wider group of experts for our panel, who did not need to be tied to an existing committee. It was now possible to include a mix of stakeholders who may not have previously been available for an in-person meeting due to scheduling conflicts or geographic distance. However, two problems became apparent: response rates and comprehension.

Response rates: With so much work taking place online, I found that it was not always easy to get a response. People reported being fatigued by the sheer volume of email messages in their inboxes. Response rates were negatively impacted.

Comprehension: Left to interpret the instructions on their own, some participants misunderstood what was expected of them, and in some cases misunderstood the assessment tool itself. Whereas in previous in-person formats, there was always a time for questions and answers, for shared understanding; the email format did little to help those who may not have felt comfortable to speak up or may not have known they had a misunderstanding. With the reality of online studies continuing for the foreseeable future, I knew I needed to address both these issues.

Our Graduate Special Education program found that its validity respondents did not understand what they were supposed

to do, and more importantly did not understand the assessment tool they were supposed to be evaluating. Unfortunately, we did not realize this until the first study concluded and the responses indicated confusion and misunderstanding. To prepare for a second study, I worked closely with the program director to make sure that all instructions were made explicit and clear. We updated and elaborated the introductory text, including the descriptions for the responses. I made sure to include the assignment instructions with clear instructions to the panel, as to what they were reading and what their task was for the validity study. Perhaps equally important, I spent time revising the email invitation to explain the study more fully. I had been hesitant to add more text to the email, given the email fatigue I suspected we were all under, but in doing so, I neglected to provide sufficient detail to the panel for them to do their job. The results of our second study were so much more meaningful, and the responses demonstrated that the participants understood their assignment at hand.

In another example, our School Psychology program struggled with response rate. It seemed that our panel of experts were overloaded by other responsibilities and response rates dropped precipitately. While the first study conducted resulted in 18 responses, the assessment did not achieve validity and therefore needed to be revised and sent out again. The second study resulted in only two responses, even after repeated reminders. I knew at this time that we needed to take a different approach. In this case, instead of working on revising the instructions or the email messaging, we focused on strategies to increase the response rate. We first created a "validity study group" of individuals who were invited to participate in this work, to help the program with its accreditation demands. In my messaging to the group, I made sure to emphasize what a special group they were and how instrumental their expertise will be to the life of the program. To further sweeten the situation, we were able to offer small gifts that were left over from student events, such as t-shirts and padfolios. We also chose to send four separate assessments at one time and presented it as our spring validity study. With these changes, the response rate skyrocketed to 100% and we were able to collect the feedback we needed to achieve validity.

LIMITATIONS AND UNEXPECTED BENEFITS OF THE VIRTUAL FORMAT

The shift to working with faculty in a virtual format was sudden and unavoidable, and with that change, came concerns. The most noticeable and immediate limitation for the virtual implementation was the lack of real-time interaction, to assist participants with understanding the validity study. The studies were now being conducted exclusively by Qualtrics survey link, asynchronously. An additional caveat was that the participant groups were expanded during the pandemic, meaning that there were often people who were unfamiliar with the process left on their own to complete the task. I was naturally concerned about the impact on the quality and richness of the collected responses.

In the past, because the studies were conducted in a group setting, there was ample time to discuss the assignment for all to hear. Even people the quietest people in the room were able to benefit from listening to the questions of others. Now we had to rely on the written word to provide instructions. The first couple studies conducted were fraught with low ratings and I began to wonder about the data quality. Working closely with the program director, we developed a new set of instructions that elaborated on the expectations for the assignment. I suspected that people may not have understood the distinction between the different response choices, given the overall low data collected. I wrote the instructions in such a detailed way that I feared the participants might be offended. To my relief, responses were much more favorable in the second study, and the comments affirmed that folks were grateful for the guidance. I was now able to determine which areas were genuinely of concern, and what areas were merely a product of confusion. The virtual format certainly had its limitations and presented concerns for data quality, but with diligence and patience in refining the approach, I believe it is possible to collect reliable data.

As time went on and we adjusted to the new processes, I began to witness several unexpected benefits of virtual format. Let's look at our biannual faculty assessment retreats as an example. Twice a year – once in the fall semester and once in the spring semester – we convene our college faculty and staff in an assessment retreat to share data and discuss ideas for program improvements. These retreats can be quite loud in past years, as we gather physically around tables, usually in one large room. There would be paper folders provided with numerous printed handouts displaying the assessment data for each academic program.

With the shift to a virtual format, we no longer had that same in-person social scene. We were not able to share a meal together or have impromptu side conversations as we walked past each other on the way to our seat in years past. However, what we did find was that there were many unexpected benefits to conducting a large-scale meeting in an online format. For example, it became easier for group work to take place simultaneously without that same noise factor that was present in-person. As one faculty member shared, they preferred online meetings because they could finally hear each speaker since they could control the volume on their computer. We also found that it was easier to look at the same data sets, as rather than shuffling through multiple packets of paper, we could now have one presenter share their screen, enabling the entire group to focus on the same data at the same time. With the aid of the computer screen, we could even enlarge the type, and point to it using various software tools.

As part of our quality assurance system, and to meet accreditation requirements, we also share data with program advisory groups to connect with external stakeholders such as internship supervisors, employers, and alumni. These folks do not work at our university and usually have a full-time job outside of higher education, which can present challenges to convening in-person meetings. With the virtual format, it became easier to convene these meetings, as the participants no longer had to travel to our physical campus. Although we were concerned at first that virtual meetings might feel impersonal, they actually proved to be more inclusive of people who may live geographically farther away, or have childcare issues and need to be home.

SOCIO-EMOTIONAL SUPPORT FOR ADMINISTRATORS

The research on assessment and accreditation all too often focuses on the data – quality, assessment design, analysis, and reporting. The pandemic brought to light the importance of paying attention to the wellbeing of everyone involved in education (Eadie et al., 2021; Van der Bijl-Brouwer and Price, 2021), but less has been researched on assessment coordinators and other higher education administrators tasked with assessment and accreditation. Just as the wellbeing of students and educators has been identified as essential to positive learning outcomes (Hill et al., 2021), it is my perspective that the wellbeing of education administrators is similarly important. After all, the administrators contribute to the culture of their work environment, and if they are struggling, it is only natural that their work relationships would struggle too.

During the pandemic, when interactions were mostly on virtual platforms such as Zoom or Microsoft Teams, it became even more important for assessment coordinators to connect with colleagues, to break the isolation. Research has shown the socio-emotional value of connecting with others through professional development and other professional connections (Worrall et al., 2021). Professional groups such as state affiliate chapters of the American Association for Colleges of Teacher Education or special interest groups within national associations such as the American Education Research Association provide a place for sharing successes, challenges, and questions, and for comradery among other assessment coordinators through regular meetings and committee work.

During the pandemic, all regular activities kept pace within my professional networks, including monthly meetings, committee work, conference planning, and other opportunities for professional development and volunteering which created a much-needed connection and break from the isolation of working from home. Pre-pandemic meetings may have had a social element to them, depending on the group, but not always. Meetings during the pandemic almost always took on dual roles, as they not only enabled ongoing learning and support, but they also provided a venue: (1) to cope with the stress of working during a pandemic; and (2) to get to know professional peers on a more personal level, as often the conversation would touch on the topic of pets, houseplants, cooking, or other hobbies. This socio-emotional support is always a benefit, but became particularly important as we became more closed off from the world during times of quarantining and office closures.

DISCUSSION

I believe that to support quality P-12 educational outcomes, we need to support the quality preparation of the teachers and school building leaders. Quality educator preparation is rooted in assessment and accreditation, as these are the continuous improvement mechanisms that encourage ongoing conversations informed by data (Darling-Hammond, 2020; Tolo et al., 2020). How educators are engaged, educated, and taught to think deeply about data, becomes the foundation for how they approach their work with students.

It is my perspective that it is an ethical responsibility of higher education administrators to continuously assess how effective our educator preparation programs are because we are all part of the larger educational system. I believe that education is the basis on which all change can take place (Schofer et al., 2021). The shift to virtual meeting structures and learning does not have to slow us down. Virtual platforms provide a more equitable system for people to participate without traveling. It can be easier for those who may need auditory assistance, because with no in-person group, they can listen to other talk with little noise interference, if any at all. Enlarging screen images make it easier for those who may need visual assistance.

Programmatic assessment offers all involved a chance to look at data and think deeply about effectiveness of the program. It is in this time of self-reflection and revisiting of educational goals that we allow ourselves time to ponder what continuous improvement is needed to support educator preparation programs and the faculty, program directors, and department chairs who are tasked with engaging with the curriculum. I would argue that it is not only possible to continue assessment and accreditation work in a virtual learning environment – it is essential, as it helps faculty and staff to continue to grow and change their programs in new and innovative ways, which is the very definition of continuous improvement.

DATA AVAILABILITY STATEMENT

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

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Beyond the Walls: Establishing Classroom Expectations in a Virtual Classroom

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Classroom expectations are clearly defined explanations of behavioral and classroom performance that help create a consistent and safe learning environment. The value of setting classroom expectations has been researched for nearly 60 years and researchers have consistently found that teachers who explicitly teach expectations have students who are: on-task at higher rates, have more prosocial behaviors with peers, and overall are more academically successful than children who have not been systematically taught classroom expectations. Setting expectations is a way to define appropriate classroom behavior and to build consistency and structure among students. As result of the COVID-19 pandemic, many classrooms around the globe are experiencing higher rates of behavioral challenges than pre-pandemic levels. Costello et al. determined that during a typical school trajectory, approximately 20% of children experience some social–emotional and behavioral (SEB) concern. There are predictions that these rates will double or triple after the COVID-19 pandemi. Educators are mandated to implement evidenced-based practices and therefore, should further explore the implementation of setting expectations while their students are engaged in virtual learning, hybrid learning, and/or returning to the brick-and-mortar classroom amidst the pandemic. The purpose of this article is to demonstrate that systematically teaching expectations to all students in a virtual setting is an innovative and effective teacher classroom practice that can then be carried into the brick-and-mortar classroom as students return to in-person learning.

Keywords: virtual instruction, classroom expectations, SWPBIS, self-monitoring, student success

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INTRODUCTION

Prior to the COVID-19 pandemic, most students were educated in-person (U.S. Department of Education, National Center for Education Statistics, 2021) and from a young age, students learned classroom expectations from their teacher(s) and classmates. In March 2020, nearly all schools quickly and dramatically transitioned to virtual (entirely online) instruction due to the necessity to lock-down and quarantine amidst the coronavirus pandemic. Over a year later (as of May 2021), approximately 50% of K-12 students in the United States continued to participate in virtual or hybrid instruction (U.S. Department of Education, National Center for Education Statistics, 2021). Hybrid instruction, also referred to as a blended classroom involves most course activity being conducted online, but there are some required face-to-face instructional activities, such as lectures,

discussions, or labs (Mayadas et al., 2015). While many students have returned exclusively to brick-and-mortar classrooms, it is evident that some families have opted to continue with virtual or hybrid instruction at a rate higher than pre-pandemic levels (American Enterprise Institute in partnership with the College Crisis Initiative of Davidson College, 2021; Saaverda et al., 2021). Many children continue to encounter various (and sometimes quite unpredictable) instructional formats and ever-changing behavioral expectations as the pandemic continues to impact student learning through quarantines, staff shortages, classrooms experiencing even greater academic ranges than pre-pandemic levels, and unique district instructional shifts.

As educators and students return to brick-and-mortar learning, the fluctuation of behaviors displayed in the classroom has become even greater than pre-pandemic levels, given that student experiences ranged dramatically throughout their time participating in virtual learning [National Association of School Psychologists [NASP], 2020]. Without a doubt, behavioral expectations throughout virtual learning varied greatly across homes given each family's unique circumstances while navigating a global pandemic (Goudeau et al., 2021). As a result of the factors listed above, students of all ages are now presenting with a vast range of social, behavioral, and academic skills/needs. Costello et al. (2003) determined that during a typical school trajectory, approximately 20% of children experience some social–emotional and behavioral concern. National Association of School Psychologists [NASP] (2020) now expects these rates to double or triple after the COVID-19 pandemic.

In addition to these variables impacting student behavioral success, most children who are currently enrolled in grades kindergarten through second grade have not yet experienced a full typical year of elementary school. Beyond their early elementary experience being upheaved, these young learners had their preschool experiences greatly disrupted as well. Preschool and early elementary is a developmental time where students learn school readiness and behavioral/social group interactions, yet most students in grades kindergarten through second grade missed this developmental opportunity due to the necessity to remain at home during a significant portion of their formative years [Ladd and Price, 1987; National Association for the Education of Young Children [NAEYC], 1996].

One important way to support students' behavioral success as they continue to participate in virtual learning and/or prepare to return to brick-and-mortar learning is to prioritize setting clear expectations within the classroom. Classroom expectations are clearly defined explanations of behavioral and classroom performance that help create a consistent and safe learning environment (Madsen et al., 1968; Grossman, 2004; Van Acker, 2007). Most students thrive on having expectations because expectations are a way to define appropriate classroom behavior while building consistency and structure among students (Zimmerman and Zimmerman, 1962; Madsen et al., 1968; Henley, 2006; Van Acker, 2007; Hester et al., 2009). Researchers suggest that when teachers set expectations, it increases the probability of increased levels of appropriate classroom behaviors (Center on Positive Behavioral Interventions and Supports, 2020). Latham (1997) found that teachers who taught expectations had students who were (1) on-task at higher rates, (2) had more prosocial behaviors with peers, and (3) were more academically successful than students that had not received systematic instruction regarding classroom expectations. As an added benefit, the teachers had additional time to instruct and had a higher rate of positive interactions with their students. Taking it a step further, researchers have found that uncertainty regarding teacher expectations can result in students engaging in unacceptable behaviors (Walker et al., 1999).

After careful review of the literature, there are four important factors to consider when setting classroom expectations in a virtual and/or hybrid setting to prepare students to a transition back to brick-and-mortar schools. These include (1) Co-development of positively-phrased expectations; (2) Ensuring that expectations are age-appropriate and easy to understand; (3) Teaching expectations to fluency; and (4) Empowering students to take ownership of the class expectations by systematically teaching them to self-monitor their behaviors. Each of these factors will be expanded upon.

CO-CONSTRUCT EXPECTATIONS WITH STUDENTS AND ALLOW THE STUDENTS TO HAVE A VOICE IN THE PROCESS OF CREATING AND SETTING POSITIVELY-PHRASED EXPECTATIONS

Sugai and Horner (2006) assert that expected behaviors should be clearly defined within the classroom. It is incorrect to assume that students of any age should know what is expected of them without explicit instruction and clearly defined expectations. Many educators advocate having students help develop class expectations and/or have them participate in defining what the expectations look like (Maag, 2004; Burden, 2006). This can be done in-person or virtually by holding a class meeting and encouraging all students to brainstorm a list of positively-phrased expectations that they would suggest the class adhere to. Once the list is exhausted, the class can work together to whittle down the expectations to three to five mutually exclusive expectations that are framed positively (Miller, 1956). Miller (1956) was the first to identify that working memory has limitations and therefore, he asserted that more than five expectations may be difficult for students to recall. Setting three to five mutually exclusive expectations is the ideal range because students and staff can quickly recite and remember them. Practically speaking, most people would not remember more than five to seven items from a grocery list if they hadn't written them down.

It is also important to ensure the expectations are operationally-defined and stated positively so that the students are continuously exposed to the behaviors that are expected (Grossman, 2004; Maag, 2004; Burden, 2006). For example, if the class expectation is to "Be Kind," teachers can ask their students what "Being Kind" means to them. Students can incorporate their own words to demonstrate what being kind means to them. Co-constructing expectations can be a fun and interactive

process. Students can be creative and write, draw, take pictures of themselves, find pictures on the internet or in magazines of examples and non-examples of the expected behaviors. Allowing students, this opportunity to develop the class expectations is helpful in ensuring students fully understand the expectations (Burden, 2006).

Student-constructed expectation charts can be displayed in the virtual or brick-and-mortar classroom, as a reminder of the agreed upon expectations. Virtual instructors are encouraged to consider using an interactive online whiteboard/bulletin board such as Google Jam Board for co-creating the class expectations (Google, 2022). Throughout the school year, expectations across elementary, middle, and high school evolve. Therefore, expectations can be fluid within a classroom and can be added to or modified throughout the year (Maag, 2004).

CONFIRM THAT THE EXPECTATIONS ARE SIMPLE, EASY TO UNDERSTAND, AGE-APPROPRIATE, AND ENFORCEABLE

There is consensus that classroom expectations should be simple, easy to understand, positively stated, and enforceable (Hemmeter, 2007; Gable et al., 2009). Once the (three to five) expectations have been set, they should be clearly communicated and reviewed (McIntosh et al., 2010). Graphic organizers and scaffolding strategies may be helpful in clarifying the expected behavior and establishing classroom routines (Rock, 2004; Bear, 2005). It is important for educators to remember to use language that is familiar to their students yet, they can also make teaching expectations feel relatable by tying the expectations to the classroom themes. For example, if a teacher has a space themed classroom, using terms like "Out of this world!" might be language to reinforce the expectations.

Gable et al. (2009) found that teacher expectations vary across learning environments and therefore the expectations should be publicly posted and reviewed on a regular basis. Examples and non-examples can and should be modified for every virtual and in-person learning environment. Just like one would provide examples of how expectations differ on the recess yard, in the classroom, or in the library; educators can also provide differentiated examples of expectations in the online environment during group instruction, throughout independent work, in breakout rooms, and in virtual reward rooms.

Many schools embrace School Wide Positive Behavior Interventions and Supports (SWPBIS); an evidenced-based framework for improving school climate, social-emotional competence, academic achievement, and decreasing unsafe behavior in schools (Lee and Gage, 2020). Just as in a brick-and-mortar schools, SWPBIS can be used to make virtual instruction more effective than schools that do not embrace SWPBIS (Center on Positive Behavioral Interventions and Supports, 2020). School-wide expectations can easily be incorporated into classroom expectations including in a virtual/hybrid setting. Centennial School of Lehigh University (Lehigh University, 2002) is an excellent example of SWPBIS expectations. The Centennial School's Take Five Program, which is modeled after the nationally recognized High Five Program of Fern Ridge Middle School in Veneta, Oregon (Taylor-Greene and Kartub, 2000) meets all the criteria outlined above: five positively stated expectations:

a. Be There, Be Ready
b. Be Responsible
c. Be Respectful
d. Keep Hands and Feet to Self
e. Follow Directions

When adopting school-wide expectations as class expectations, students can still engage in co-construction of posters or digital bulletin boards that outline examples and non-examples. Neef et al. (1983) found that including a "do" and "do not" example increases the rate at which students comply with classroom rules. Some teachers choose to further enhance the understanding of the class expectations by including visuals cues while teaching examples and non-examples that align with each expectation (Jaime and Knowlton, 2007). Co-constructing examples and non-examples not only helps students understand what is expected but also clearly demonstrates what is not expected as well. Additionally, it ensures consistent language of expectations across various staff that support students in-person or through virtual instruction. When everyone is clear of what is expected, students will thrive and learning will flourish. This is even more important now, following over 2 years of unexpected learning amidst a global pandemic.

Making expectations enforceable means setting reasonable expectations based on the levels of the learner(s). For example, the expectations regarding "Following Directions" would look very different for a preschooler than the expectations set of "Following Directions" for high schoolers. Sharing the agreed upon classroom expectations with parents/guardians further supports enforceability, generalization, and follow-through across settings (Forehand et al., 1981). It is recommended that educators use enforceable terminology that could easily transfer from virtual to in-person learning to further streamline the transition as students move back to brick-and-mortar instruction.

TEACH TO FLUENCY BY *EXPLICITLY* TEACHING AND PRACTICING THE EXPECTATIONS

Co-creating and visually displaying class expectations is a valuable first step in supporting students in learning class-wide expectations. Next, the expectations must be taught, reviewed, and practiced (Hester et al., 2009). It would be remiss to assume that students remember the classroom expectations, in-person or virtually, if they are exclusively posted at the beginning of the year and not revisited. Children thrive when they have been systematically taught the meaning of each expectation to fluency (Burden, 2006). Fluency is defined as response accuracy and rate that demonstrates understanding (Binder, 1996). Explicit

teaching and practice are needed to bring new skills to fluency (Center on Positive Behavioral Interventions and Supports, 2020). When students can quickly and accurately identify what is expected of them, they are more likely to understand and engage in expected behaviors. Gable et al. (2009) suggested that by limiting the number of expectations to three to five, the expectations can be more easily be taught directly and systematically. This further supports the notion that it is ideal to have no more than five expectations.

One way to enhance a student's grasp of the class expectations is for educators to provide positive behavior-specific praise when they observe their student(s) demonstrate appropriate expected behavior(s) in person or in the virtual classroom. Behavior-specific praise is most effective when it is immediate and includes an identification of the expected behavior (Alberto and Troutman, 2017). Teaching to fluency and providing behavior-specific praise are strategies that can be easily implemented within a virtual educational setting.

As alluded to above, best practice suggests that educators do not simply post or share expectations exclusively at the beginning of the year but rather, dedicate brief frequent instruction targeting the expectations (Paine et al., 1983). The action of practicing and reviewing classroom expectations (even if just for a few short minutes) should be a priority for teachers at any grade level. In a brick-and-mortar classroom or virtual setting, teachers can infuse language aligned with the expectations throughout the school day by "catching" students engaging in the class expectation and labeling it (i.e., "Amelia, I love the way you are *Following Directions* by starting your classwork"). Educators can make explicit teaching interactive by incorporating games, role play, modeling, and/or infusing other digital mediums such as online resources. For example, Blooket (Stewart, n.d.); PollEV (PollEverywhere, 2022); or creating short videos on social media using TikToc (ByteDance, 2022) or FlipGrid (Microsoft, 2022) may be ways to further enhance instruction of class expectations in a virtual format. Using engaging instructional modalities is an effective way to reinforce expectations in an enjoyable and innovative way.

EMPOWER STUDENTS TO TAKE OWNERSHIP AND RESPONSIBILITY OF THEIR OWN BEHAVIOR. RECOGNIZING EXPECTATIONS IS THE FIRST STEP OF TEACHING SELF-MONITORING

Axelrod noted that when students learn to manage their own behaviors, the outcome is win—win: The students have learned an important life skill; becoming more independent (which leads to increased quality of life) while simultaneously, the teacher is provided with the opportunity to focus more on academic instruction and adaptive behavior skills (Salter and Croce, 2014). Self-management can successfully increase behavioral and classroom performance and contributes to increased time in the least restrictive setting (Wehmeyer et al., 1998; Dalton et al., 1999; Koegel et al., 1999; Todd et al., 1999). Students who engage in self-monitoring show an increased level of self-determination (Wilson, 1999). Researchers have been specifically studying self-management since the 1960's. More recent evidence of self-management interventions are synthesized in the National Autism Center's National Standards Report (National Autism Center, 2015), the Research Synthesis on Effective Intervention Procedures from the University of South Florida Center for Evidence-based Practice (Dunlap et al., 2003) and the National Professional Development Center-Evidence Based Practices (Steinbrenner et al., 2020).

In its simplest terms, self-management involves the individual use of behavior change procedures that produces a desired behavior change (Cooper et al., 2007). Self-management procedures consist of a series of steps where a person first determines whether a specific behavior has occurred, next records the occurrence of this behavior, and then obtains access to reinforcement (National Autism Center, 2015). A goal of self-management is to help the student become more independent and less reliant on teacher directed behavior management strategies (Newman et al., 1995).

Recognizing expectations is the first part of teaching self-monitoring. Notably, the first and important step of self-monitoring in schools is for the student to identify what target behavior(s) to self-reflect on. Having clear expectations encourages students to accept increased responsibility for their own behavior (Gable et al., 2009). This brings the reader back to Sugai and Horner's (2006) assertion that a critical first step teachers should take is establishing classroom expectations with their students. Once these expectations have been clearly learned by students, they can be on their way to developing the valuable life skill of self-monitoring.

Self-management tools are highly versatile and can be completed on paper, *via* self-monitoring apps, and can be incorporated into a virtual setting by utilizing the Google Suites (Sheets, Slides, and/or Jam Board). The key to setting up any effective self-management system is pre-planning; working smarter, not harder. It is important for teachers who incorporate self-management systems in their classrooms to consider the logistics before beginning to implement the strategy. Some of the variables to consider when setting up an in-person or virtual self-monitoring system include: (1) Operationalizing target behaviors, (2) Identifying procedures and schedule for monitoring the behaviors, (3) Confirming that the expectations are simple, easy to understand, age-appropriate, and enforceable, (4) Planning the reinforcement procedures to implement when the goal is met, and (5) Fading of the intervention as mastery is achieved (Salter and Croce, 2014).

While this manuscript is not intended to expand on how to implement self-management interventions, the reader is encouraged to take a deeper dive into articles summarizing the effectiveness of self-management in schools. When students acquire the skill of monitoring and reflecting on their own behavior, they can become more independent, self-determined, and have an improved quality of life (Salter and Croce, 2014).

CONCLUSION AND RECOMMENDATIONS

Whether students are learning in a virtual environment, hybrid, or brick-and-mortar setting, educators cannot presume children will know how to behave in a classroom without explicitly teaching expectations. Regardless of where or how they are receiving their instruction, it is our responsibility to systematically teach classroom expectations so that students can be successful learners. Due to the ongoing coronavirus pandemic, students are experiencing a time where there is uncertainly all around them and educators can further support their students by providing structure, routine, and predictably within the virtual, hybrid, and brick-and-mortar learning environment.

Infusing technology while systematically teaching expectations to students in a virtual setting is an innovative and effective teacher practice that can then be carried into the brick-and-mortar classroom as students return to their school campus. It is also a strategy that should be implemented with students who continue to attend school virtually on an ongoing basis. Hester et al. (2009) reviewed the literature of classroom expectations and found that they have withstood the test of time in terms of empirical support and are an essential component that should be incorporated into general classroom management to create a positive, safe, and predictable learning environment. McIntosh et al. (2010) followed this up by stressing that it is part of a teacher's responsibility to teach appropriate behavior.

Future research should investigate teacher's implementation practices of setting clear expectations. This research can dive deep to evaluate the implementation of teaching expectations (1) prior to the pandemic, (2) during virtual learning amidst the pandemic and (3) as teachers continue to navigate the return to brick-and-mortar classrooms as the pandemic continues.

In summary, there are four important factors to consider when setting classroom expectations in a virtual and/or hybrid setting to prepare students to a transition back to brick-and-mortar schools: (1) Co-construct positively-framed class expectations with student input, (2) Confirm that the expectations are simple, easy to understand, age-appropriate, and enforceable, (3) Teach to fluency by explicitly teaching and practicing the expectations, and (4) Empower students to take ownership and responsibility of their own behavior by systematically teaching self-monitoring. Recognizing expectations is the first step of teaching self-monitoring; a valuable life skill.

AUTHOR CONTRIBUTIONS

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

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Online Teaching During COVID-19: Exploration of Challenges and Their Coping Strategies Faced by University Teachers in Pakistan

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The provision and practice of an online environment have become the main challenge for many institutes including universities during the COVID-19 pandemic. However, the use of an online learning system was used by the majority of the teachers through an understanding of the adoption of ICT with the major challenges faced by them during the teaching–learning process. It has been found through this study that the teachers are lacking in ICT literacy. Therefore, they are facing online classroom management and connectivity issues throughout their journey during COVID-19. This study aims to explore the challenges and coping strategies faced by university teachers during the pandemic of COVID-19. A qualitative research method with a case study approach was used to get an in-depth understanding of the phenomenon of online teaching during COVID-19. Interviews were collected from eleven teacher educators (TEs) of the university. After analyzing the data, nine themes were generated with major findings, that is, connectivity issues, online teaching methods and techniques, learning environment for online teaching and learning, and challenges faced by teachers. The study findings are a good sought of addition and contribution for the university policymakers to evaluate, influence, and ensure the successful implementation of the e-learning system. Additionally, it is a suggestion for the university management to arrange some workshops or training programs for TEs to improve productivity and performance during their online teaching.

Keywords: online teaching, COVID-19, coping strategies, challenges, connectivity, ICT skills

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INTRODUCTION

In December 2019, a local outbreak of "pneumonia" that was previously unfamiliar, was found in Wuhan city of China, and was rapidly determined to be caused by a novel coronavirus (Dong et al., 2020). After China, it spread to other countries, which is still uncertain (Lau et al., 2020a). Moreover, the World Health Organization (WHO) confirmed the disease coronavirus (COVID-19) as a public health emergency. In February 2020, a total of 81,109 COVID-19 cases were confirmed and recorded through laboratory tests worldwide (Guan et al., 2020). COVID-19 spread almost all over the world (Bai et al., 2020), which raised fears, anxiety, and worries among people that destroyed every area of human life including education around the world (Paudel, 2020). The virus forced all systems, especially the education system to move from physical to online through a rapid transition to distance learning to reduce the impact of the virus on all stakeholders. To better control

and avoid the spread of the virus, online teaching has become a necessary strategy to restore regular instruction during the COVID-19 pandemic (Chen et al., 2020), where many universities conducted online classes for their safety from COVID-19 (Lei et al., 2021).

Everyone tried their level best to respond to the closure differently with the existing learning methods such as mobile learning, E-learning, and flip classrooms (Almaiah et al., 2020). Similarly, Martin et al. (2019) define online learning as the use of the internet to gain access to teaching materials; interact with knowledge and learners; to gain support in the learning process; and create personal meaning and get success from the learning experiences. Online teaching and learning are part of an educational process that takes place through the internet, which is the medium of distance teaching and learning experiences for both teachers and learners from various places (Kim, 2020). Before the pandemic of COVID-19, e-learning was considered a non-formal activity, but right after the lockdown, it was considered as the need to continue the education system virtually. This online teaching and learning has many educational applications in post-COVID-19, such as Neo, Zoom, Start.me, Google Classroom, Shift, Ted-Ed, Lan School, Blackboard, Edmodo, Class Dojo, Outs, We Video, and many more (Mishra et al., 2020). These apps are very useful to continue the online teaching and learning process even after the pandemic. The quick shift toward the virtual environment brought some challenges for learners and instructors as well, which has been found in a study conducted in the United States that many teachers are beginning to transform their traditional (face-to-face) teaching into an online environment (Hixon et al., 2012) while facing some challenges (Simamora, 2020). Online teaching addresses the issues related to geographical distance and for many other reasons makes the teaching and learning process unproductive (Granena and Yilmaz, 2019; Singh and Thurman, 2019). However, due to the sudden emergence of COVID-19, most of the faculty members are facing issues and challenges like the lack of online tutoring experience, pre-preparation, or support from an educational technology as it requires lesson plans, different teaching materials like audio, video material, and technology support (Bao, 2020).

Due to COVID-19, the majority of the institutes of the world were closed and transferred all their educational activities from traditional to virtual classes. Pakistan, along with other countries has closed all its educational institutes and is trying its best to fulfill the educational loss during the pandemic of COVID-19 (Sahito and Chachar, 2021). To reduce the loss of education systems, many countries are looking for alternatives that could introduce distance learning to manage and tackle the crisis. In this connection, the World Bank (WB) is partnering with the Ministry of Education in several countries to support their efforts to provide distance learning opportunities for learners (Sahito and Chachar, 2021). Pakistan introduced online education with the support of different stakeholders after having many meetings conducted by the Higher Education Commission (HEC), universities, and other concerned government departments. After starting online classes, the main problem was identified that students, teachers, and administrators have low internet access and lack ICT skills (Sahito and Chachar, 2021). According to the Economist Intelligence Unit (EIU), Pakistan ranks 76 out of 100 countries in terms of availability, affordability, and the ability of people to use the web (Reports, 2021). Pakistan is the fourth largest country in the world with inexpensive or inaccessible internet (Khan, 2019). Therefore, this study is designed to explore the challenges of online teaching faced by university teachers during the pandemic of COVID-19 and their coping strategies in the context of Pakistan. Whereas, some objectives and research questions have been developed to explore the answers to the questions, respectively, to understand the phenomena, for instance: (a) To understand the perception of university teachers about online teaching during COVID-19. (b) To identify the challenges faced by university teachers during online teaching in the COVID-19 period. (c) To explore the coping strategies to overcome challenges of online learning during COVID-19. While the research questions were as follows: (a) What is the perception of university teachers about online teaching during COVID-19? (b) What challenges, issues, and problems are faced by university teachers during online teaching during COVID-19 period? (c). How do university teachers cope to overcome the issues, challenges, and problems of online learning during COVID-19?

As the lockdown ended in most countries, the results of this study would be a good lesson for the institutions and the faculty members to continue their teaching–learning processes by dealing with the challenges and issues that occurred in any difficult situations. Whereas, the developed countries have sound resources to deal with difficult situations, the developing countries are much more behind them to deal with critical situations. Therefore, the findings of this study would be more beneficial for them to learn new techniques of the solutions to their problems within the limited resources.

LITERATURE REVIEW

Online learning is defined as distance learning with the help of electronic devices, for example, tablets, smartphones, laptops, and computers, that require an internet connection (Gonzalez and Louis, 2018; Abbas et al., 2021b). However, the studies in the related literature show the need for the readiness of countries in situations like a pandemic toward education. The global spread of COVID-19 has led to the suspension of classes for more than 850 million students worldwide, disturbing the original teaching plans of schools in all countries and regions (Chen et al., 2020). In the pandemic situation, the students were not allowed to go to school by their governments, institutions, and parents (Abbas et al., 2021a), which was alternated with a shift from traditional education to online education (Basilaia and Kvavadze, 2020). The online library, television broadcasts, guidelines, resources, lectures, and video channels are available online in at least 96 countries (UNESCO, 2020). Additionally, Google had announced that it would offer enterprise video conferencing features such as large meetings for up to 250 people and free recording functionality for G-Suite for Education customers from 1 July 2020. Furthermore, Zoom had removed

the video time limit and increased this by accepting the request from China, US, Italy, and Japan. In many countries, selecting the online educational platforms provide chances for university students, teachers and other concerned stakeholders to increase the collaborations and get experience from digitalization (Rowe, 2016). In these years, higher education associations have developed progressively to offer online courses as a major aspect of their curriculum, which is giving access to a wide range of viewers, audiences, and participants to improve, increase, and enhance the learning for educational forms (Soffer and Cohen, 2019). Most of the important elements of online courses are participant engagement and evaluation of the course on low cost and budgets. An advantage of the online course is that it gives the opportunity of strong linkage to the community of participants toward the engagement, participation, integration, and collaboration of course activities (Tanis, 2020) to bring innovation to learning. Online teaching opportunities develop the knowledge and experiences of the teachers to improve the basic qualities of graduates and their programs through social media and many new collaborative online technologies, which are gradually embedded in higher education to make learners familiarized with the context of learning in open online spaces (Rowe, 2016).

Many researchers have compared the results between traditional (face-to-face interaction) and online education for university students, which revealed that the students who have a poor educational background or had lower grades in their previous academic records, perceive online education as a mess of the learning process (Jaggars and Xu, 2016). Similarly, Soffer and Cohen (2019) highlighted that online education increases the dropout ratio of students in the learning process, which can be the cause of failure and social isolation of a learner and economic loss (Lee et al., 2013). In this connection, Palvia et al. (2018) shared their point of view in another way that students who attend online classes have skills to learn individually, they accept diversity, they are much cooperative, and they prefer to work collaboratively. An advantage is that online learning removes social and physical limitations and barriers of the students (Palvia et al., 2018), which is the proper and authentic solution to the problems of the individuals who face issues and problems when delivering high-quality education on their choice of place and time (Lau et al., 2020b).

The role of ICT in teaching, especially in higher education, cannot be reduced (Sahito and Vaisanen, 2017), which is found to be good and supportive for teachers and students (Aljaraideh and Bataineh, 2019). Online learning literature identifies two main reasons that students take online courses: (a) The online delivery model offers greater flexibility and convenience to fulfill all obligations, needs, and requirements of work and family (Xu and Xu, 2019). (b) The challenge associated with online learning is access to ICT resources, as e-learning thrives on the availability of ICT facilities (Arthur-Nyarko and Kariuki, 2019). There is the issue of access to ICT among the different locations of students, households, and areas because the internet, especially 3G networking systems are not the same everywhere (Lembani et al., 2020). ICT issues are not only common in students and areas but are common in teachers' instructions because ICT is not fully adopted in the process of teaching and learning in most educational institutions (Ghavifekr et al., 2016). Challenges of ICT and e-learning depict all these facts in technologically advanced countries and low economic countries (Sahito and Vaisanen, 2017). This is because both developed and developing countries were facing different challenges, issues, and problems during the pandemic of COVID-19. The main difference is the students' and teachers' willingness to accept and use the e-learning system to progress significantly (Almaiah et al., 2016). Previous literature highlighted many challenges of online teaching and learning, which were classified into four categories such as individual challenges, course challenges, teaching challenges, and cultural challenges that vary from country to country because of their different contexts and readiness (Sahito and Vaisanen, 2017). Connectivity issues, lack of ICT knowledge, content delivery, and students' IT skills were found to be the main challenges during the implementation of online learning in developing countries (Aung and Khaing, 2015). Similarly, Kanwal and Rehman (2017) highlighted that the Pakistani education system has three main challenges in digitization such as computer self-efficacy, system characteristics, and internet experience. Another study suggested that the technical issues, which are the key to the success of e-learning systems, indicate that 45% of e-learning projects in developing countries are complete failures, 40% are partial failures, and only 15% are successful (Al-Araibi et al., 2019). However, the faculty and students say that with an online learning model, they are unable to teach and learn both practical and clinical subjects (Mukhtar et al., 2020) because they can teach and assess the knowledge component only. There is no immediate feedback, teachers cannot assess students' understanding during online lectures, students have limited attention spans and are intense toward online learning characteristics, which were supported by teachers that during online classes, students misbehave and attempt access to online resources during assessments (Mukhtar et al., 2020).

In the theoretical framework (**Figure 1**), online education is shown as interactive and effective for the teaching and learning process, which is highlighted by Lou (2008) that the rapid growth and development of ICT in teaching has emerged to methods like problem-based learning, case-based learning, interactive learning, task-based learning, and construct of theory belongs to social constructivism suggested by Kim (2001). Moreover, in online classes, most of the teachers try to use a constructivist approach like group work, learner-centered, pair work, cooperation, and project work and its process emphasizes inferential meaning, generates opinions, and develops critical thinking (Paudel, 2020). Where, Visual-Spatial Intelligence can understand patterns of space (Smith, 2002) to understand visual-spatial intelligence and multiple intelligence through the development of capabilities of learners during online education in different terms like art, drawing, jigsaw puzzles, map reading, project making, illusion, illustrations, musician, and naturalistic. The students and teachers can accurately perceive the world due to their sensitivity to visual-spatial aspects, video conferencing, 3D modeling, videos, TV programs, multimedia, and text with images/diagrams/graphics that can be the best tools to unleash

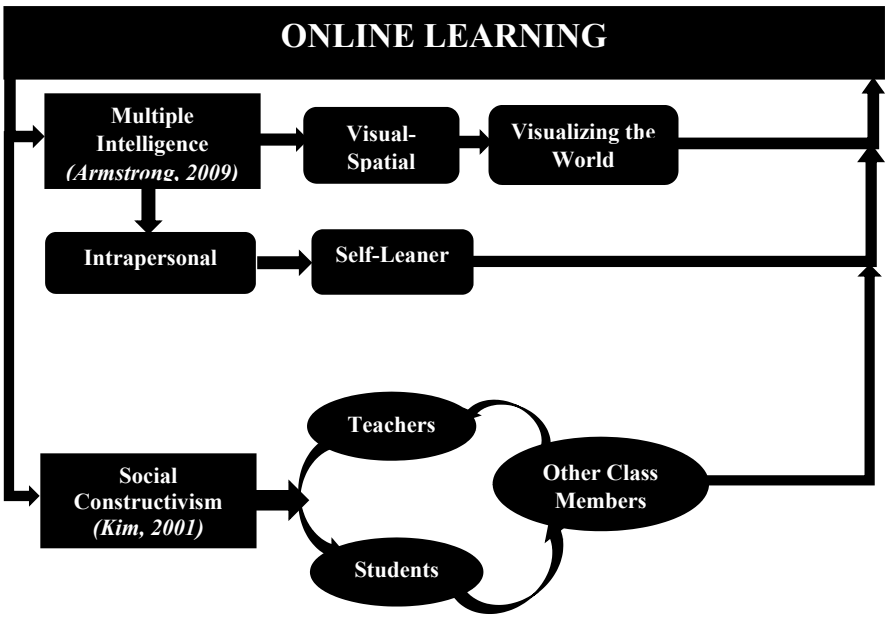

FIGURE 1 | Theoretical Framework made by authors with the help of Kim (2001), Armstrong (2009).

their creativity (Paudel, 2020; Sahito and Vaisanen, 2021). Due to their ability to orient themselves in any online activities, they can represent a graphical demonstration by showing their creativity in shapes, colors, lines, and forms (Armstrong, 2009).

MATERIALS AND METHODS

Philosophical Stance

This study employed multiple intelligence and constructivist approaches as its theoretical framework to explore the teachers' and students' challenges and the possible strategies to be adopted during and after COVID-19 in the higher education institutions of Pakistan. The overall picture of a research activity consists of the model linking theoretical values as a specific paradigm (Sarantakos, 2013) of constructivism called a worldview (Creswell, 2014), which is also used by many researchers (Mertens, 2010; Lincoln et al., 2011) and is connected with epistemology (Crotty, 1998) that is broadly conceived as a research methodology (Neuman, 2009).

Research Method and Approach

A qualitative research method was used for this study to gain an in-depth understanding of the online instruction during COVID-19, which allows the researchers to ask open-ended questions from the participants for in-depth statements depending on words, ideas, opinions, etc. (Creswell, 1994, 2014). This approach is used to gain a better understanding of the existing problem in which researchers begin with a general idea and use it as a medium to identify issues that may be of focus for future research. Social constructionism has been used as a philosophical position in which every individual seeks knowledge according to their personal experiences. The researchers believe that every individual has a way to explore the world. Therefore, qualitative research gives an in-depth knowledge of what they experience. The case study approach was used because researchers wanted to explore the phenomenon of online teaching and learning during the COVID time, as Yin (2018) highlighted that case study research is a qualitative approach in which the investigator explores a bounded system (a case) or multiple bounded systems (cases) over time through detailed and in-depth data collection procedures and involves multiple sources of information like observation and document analysis.

Data Collection and Analysis

The data were collected from (n = 11) teacher educators (TEs) through semi-structured interviews and the available documents were also analyzed to make the data authentic. The data were analyzed through a thematic analysis strategy, which is a suitable method for finding, analyzing, and reporting patterns of themes within the data (Braun and Clarke, 2006). All conducted interviews were transcribed first, then responses were distributed in different chunks, and such chunks were given the codes to generate the scientific themes. However, the first step in the thematic analysis was to get familiar with the data, which involves the detailed transcription of the collected data. After the coding process, all codes have been combined to form some comprehensive and scientific themes, which have been reviewed, revised, and finalized. Moreover, some categories fall into each other, and then nine themes were founded and finalized, which were refined and defined again to use for final analysis and report writing. The trustworthiness of the data and results were checked through member checks from the interviewees, and then the results were sent to experts

in the field for confirmability as an audit trail suggested by Lincoln and Guba (1985).

RESULTS

Interviews allow the researcher to listen to the different, attractive, and meaningful stories of TEs. In this study, eleven (11) TEs were interviewed and found to be impressive in constructing the true primary data for this study to analyze into a narrative and then create a theme. Additionally, the names of participants were kept confidential as per the agreement signed before conducting the interviews. The participants' names were replaced with teacher educator codes like (TE-1), (TE-2), or TE (3), and so forth, moreover, the essential narratives were recorded, selected, and encoded to analyze the data of the study.

Perception of Teacher Educators About Online Classes

The perception about online classes was extracted from the data in which 64% of TEs perceived that online classes are not the proper and authentic replacement for face-to-face classes. It was found that face-to-face classes have more interaction among students and teachers, which provides more opportunities to discuss everything than online classes. However, TEs perceive online classes as a kind of replacement for relaxation in the educational process, which can be conducted at their ease and in favorable places and times. **Table 1** provides a complete perception in detail through direct statements of TEs about online classes during COVID-19.

Readiness of Teacher Educators for Online Classes or Learning

About 90% of the TEs perceived holistic development as a key skill that they needed the most in their personal and professional life (**Table 2**). They perceived ICT skills as an honor and special need during the time of COVID-19. It is not only essential for TEs but necessary for students, a majority of whom do not know the usage of ICTs in online classes. Therefore, the holistic development and readiness of ICT of TEs and students are required to conduct online classes smoothly for better learning to take place.

About 90% of the TEs showed their readiness for online classes, which was found theoretically but the majority of them were not found practically ready for the sudden shift toward online classes. The TEs maintained their readiness with the passage of time, training, counseling, and guidance. The sudden shift toward digitalization harmed the teachers' and students' lives because they were not fully prepared for the immediate shift. The TEs and students were facing different challenges, issues, and problems with online classes because they did not attend the classes for getting an education but for "off learning," which was not enjoyable to them due to its issues and challenges.

TABLE 1 | Perception of TEs.

Items	Statements
Effectiveness of online classes	Online classes are a blessing for learners, especially in COVID time (TE-11)
	I support online teaching in the COVID period (TE-06)
	Virtual classes are good because of their relaxation and comfort (TE-01)
	Online classes are not more effective as face-to-face classes are (TE-02)
	Face-to-face interaction in the classroom gives more opportunities to learn and accrue skills (TE-07)
	Online classes are not very effective in our context like Pakistan because we do not have a big enough budget to deal with the expenses (TE-10)
	Online classes are not a substitute for face-to-face classes (TE-08)

TABLE 2 | Readiness of TEs.

Items	Statements
ICT literacy	You know, we teachers are not using ICT as we should use it (TE-10)
	Digital literacy is one of my interested areas and the institute has to operate (TE-03)
	Students were unaware of ICT literacy, they even struggled to mute and unmute themselves (TE-09)
ICT skills	Teachers need perfect skills in ICTs while attending online lectures (TE-05)
	Holistically development of ICTs is required for teachers in online teaching (TE- 01)
	ICT is becoming a part of the teaching and learning process (TE-08)
	It was a very challenging job to work on technology because we were not very much skilled at using the internet and using different media (TE-02)
	It also gives us time as educators and as a pedagogue to explore our; in specific those lacking areas where we can develop our competencies in terms of teaching and learning (TE-11)
	I've never actually used the ICTs because I never needed to use them (TE-04)
	You know, we teachers are not very skilled, especially in technology (TE-07)
Readiness of TEs	Students were not ready to attend virtual classes (TE-04)
	Students do not attend classes for the sake of learning. They attend classes to only pass the content (TE-07)
	Students preferred my (teachers') role more in online classes (TE-08)
	Students were not prepared for the online environment due to some issues at their places (TE-11)
	Students are less interested in online classes; they are struggling too much to cope with the processes (TE-02)
	Students do not find the motivation to enjoy (TE-03)
Shift toward digitalization	It was a sudden shift to a digital environment for all of us, which made us feel alienated (TE-09)
	COVID-19 harmed our lives and teaching system and we were not ready for digitalization (TE-10)
	By nature, we are human and we are not even ready to take alternatives in even the COVID-19 situation (TE-05)
	We were not ready because of the sudden shift and flaws of this system of online teaching (TE-06)

Challenges, Issues, and Problems of Virtual Classes During COVID-19

Challenges and issues in virtual class during the pandemic of COVID-19 was the key theme where 100% of the TEs participated and faced connectivity issues and were not having a proper learning environment (**Table 3**). Some TEs and learners did not have proper Wi-Fi and 3G connection to attend their online classes. They moved from their small villages to towns and cities and joined hostels where they could get a good internet connection even during the lockdown periods. Some of them belonged to remote areas where they did not have proper electricity connection, which was mentioned by TEs as classroom management issues while teaching online classes as connectivity to the Wi-Fi caused linking and off-line problems.

TABLE 3 | Challenges, issues, and problems of virtual classes during COVID-19.

Items	Statements
Connectivity	Connectivity was the key issue in the online system (TE-04)
	Students do not have WI-FI, 3G, and 4G at their places, so they were unable to get their internet connection with the online learning system (TE-07)
	Due to the electricity students disconnected (TE-01)
	Internet connectivity was the major issue that has remained unresolved till the end of the first wave of COVID-19 (TE-09)
Students challenges	Students that are in remote area areas and localities indicated that internet access was one of the major issues for them (TE-03)
	Students have issues like: I thought maybe the open space will allow better internet connection, and noise levels interfering with internet connection were: is there a lot of wind there, or maybe birds chirping, any kind of interference influencing internet connection (TE-08)
	Students whose basic education level is strong can cover anything. There are however also weak students; they are slow learners and they can face learning or comprehension issues (TE-11)
	No gadgets were needed, proper preparation was done and management of issues was achievable (TE-05)
	We could identify students who are residing in rural areas or who are introverted as those students used to speak less in online classes and were slow learners (TE-02)
Learning environment for online teaching/learning	Students attend online lectures while doing work in villages and the learning environment is challenging (TE-06)
	I have moved from my home toward the town hostel where light and Wi-Fi were available (TE-01)
	The place where we are residing is situated close to workplaces which create a lot of noise due to the use of machinery or other equipment used to fulfill tasks. So that disturbs me (TE-08)
	In online systems students were cut off from their family; it means they have been isolated in a room so their life due to COVID-19 and their social and communication skills are destroyed (TE-04)
	I live in a hostel in the center of town during the first pandemic of COVID-19 (TE-10)
Challenges faced by teachers	Teachers are from different social sciences backgrounds, like Sindhi teachers, Pakistan studies, Urdu teachers, so they were not exposed to this kind of teaching, but this is what I am willing to admit as this has nothing to do with me although it involves the teaching they presented (TE-03)
	It was quite challenging for me to deal with ICTs issues, which were resolved with the help of my colleagues, friends and IT department officials (TE-11)
	Classroom management is the biggest issue for faculty members just because of the digital shift (TE-09)
	Somehow in terms of technical issues and digital content development, teachers had challenges (TE-07)

Teaching Instructions, Software Applications, and Platforms Used for Online Classes

Table 4 provides complete detail about teaching instructions, software applications, and platforms through direct statements of TEs about online classes during COVID-19. About 63% of the TEs talked about the teaching methods and techniques during online classes, which were used by the majority of TEs as a student-centered approach. TEs involve their students in blended mode and discussion to engage them in the discussion forum

TABLE 4 | Teaching instructions, software applications, and platforms used for online classes.

Items	Statements
Teaching methods and techniques	Most of the teachers use blended techniques in online classes (TE-09)
	We are using a blended learning approach in which I'm using different kinds of videos and applications and different pedagogical approaches (TE-02)
	The student-centered approach was dominant in my online class (TE-11).
	The flip classroom was in practice in online classes (TE-05)
	I practice collaborative learning in my online teaching (TE-10)
	Online classes based on interactions; means interactive sort of classes (TE-01)
	I usually deliver my lecture with the lecture method (TE-06)
Platforms for online classes	Google Drive is one of the platforms that I usually used during online teaching (TE-07)
	When some students do not have internet and data then they contact me via Cellphone/telephone. So, I used cellphone/telephone calling as well (TE-09)
	I used emails to send material and documents to my students during online classes (TE-03)
Apps for online classes	As it was recommended by the university to use the Learning Management System App during online classes, I made use of LMS (TE-10)
	I was more comfortable with Zoom App for conducting online classes (TE-01)
	Most of the students have connectivity issues, although they have WhatsApp packages. So, I also send material to a founded WhatsApp group (TE-04)
	Some students text me via "Mobile texts" and I respond to them properly (TE-05)
	I use Google meet App to teach my students during the COVID-19, period (TE-08).
	Google classroom Apps were also dominant in my online classes (TE-02)

and collaborative works. However, some teachers were found to use the lectures or traditional methods in their online classes.

The software applications and platforms used for online classes are mentioned as important by TEs. About 81% of the TEs responded that the Learning Management System (LMS) and Zoom App were the dominant apps for conducting online classes during the period of COVID-19. They used the WhatsApp application for the ease of their students in the educational settings of their organizations. Some TEs used SMS service to communicate properly and clearly to maintain the quality of the instructions for their students who had connectivity and internet issues.

Coping Strategies to Solve the Issues and Problems of Online Class During COVID-19 and Preparation for Coming Waves

Table 5 provides complete detail about coping strategies to solve the issues and problems through direct statements of TEs about online classes during COVID-19. About 100% of the TEs discussed coping strategies to solve the issues and problems of online classes during COVID-19. The TEs remained flexible to conduct online classes and show their availability to students during online teaching. The TEs overcame the issues of connectivity and electricity *via* recording the whole class and sending it to students so they could listen when they had a good internet connection. The TEs were available 24/7 to their students because they perceived that students suffer a lot from COVID-19 and online teaching. In the table below are the subsequent statements of the TEs who revealed their coping strategies.

Most of the TEs have experience with online classes in the first wave of COVID-19 and all of them are prepared for the second wave of COVID-19 regarding online education. About 63% of the TEs show their readiness for the second wave of online classes and they prepared themselves with a much better teaching style. About 10% of the TEs were not prepared for digitalization yet because they lacked ICT literacy, which is a prerequisite for the preparation of online classes through multi-methods in digitalization. After all, learners possess various levels of intelligence.

TABLE 5 | Coping strategies to solve the issues and problems of online classes.

Items	Statements
Teaching methods and techniques	I am very flexible in online classes while giving assignments to my students (TE-01)
	I asked them to choose flexible time for online classes when they have electricity and proper Wi-Fi (TE-10)
	Before attending class, technological issues are settled. If it's not working then we record the lecture (TE-05)
	I suggested to them that it's a very important file. So, when you get a good internet connection or modem then you have to download the files. So, that you don't get disturbed (TE-07)
	I also share material on WhatsApp groups. I think most of the students have free packages of WhatsApp. So that's easier for them in terms of going to synchronous mode (TE-03)
	We augmented our time frames and didn't enforce classes at a certain time frame to accommodate all students. If students are comfortable at 10, 11, 12, we moved the class to suit the students' needs (TE-09)
	Connectivity issues were dealt with as we had the alternative to recorded lectures (TE-02)
	Teachers also need to realize that currently in this situation, we have to also think about students, so we must be flexible in assessment as well (TE-11)
Online Availability of Teachers	In online classes I also learn that you cannot be there physically, therefore teachers have to upload all the study material as well as give clear instructions, deadlines and all aspects relating to assignments (TE-08)
	I always respond to their queries on time because I know that students are under too much stress. After all, they are supposed to complete all the assignments from different subjects at the same time (TE-04)
	For students, it is easier to approach teaching than for an employee from a certain institution to approach a teaching process at the kind of work he does (TE-06).
	I try to be empathetic with students (TE-10)
	I also learned that teachers should be available all the time for students, not just in physical classes but also in online classes as well (TE-01)
	I tried my level best to facilitate the students as much as I could (TE-07)
Preparation for coming waves of COVID-19	I get to experience from the first wave and now I am much prepared for the second wave (TE-11)
	The first wave of COVID-19 had challenges to teachers and students but this wave is much better as the situation is also much better for students (TE-04)
	Now, we have got the experience of downloading this Zoom app and using ICTs accordingly (TE-01)
	I am not much prepared for the second wave because still, I am struggling during online teaching (TE-06)
Suggestions for learning during coming waves of COVID-19	There should be training for the online teaching and learning process (TE-03)
	In the second wave, there should be online gamification or some form of recreation or relaxation because students get bored while taking two hours learning sessions (TE-10)
	Not all students are auditory or visual. So, there should be some techniques or methods that give opportunity and a place to everyone where they can learn in a better way (TE-09)

Students' Engagement and Assessment in Online Classes

About 100% of the TEs shared their experience about the engagement and assessment of students in online classes where they share their perceptions about online assessment (**Table 6**). However, they perceive online assessment as the most difficult part of digitalization. They talked about the assessment of the way they assess students like they promote discussion forums, arrange online seminars, allow them to write mini-research reports, and the like. On the other hand, TEs ensure the engagement of students by asking random questions during online classes as TEs do both formative and summative assessments to ensure the engagement of students.

TABLE 6 | Students' engagement and assessment in online classes during COVID.

Items	Statements
Teacher perception about online assessment	Assessment and engagement are some of the major challenges, which that Teachers as pedagogues are facing all over the world (TE-03)
	Assessment is difficult in online classes (TE-07)
	Teachers also need to work on the assessment practices as well; they have to come up with those assessment approaches, in which they can assess the students (TE-05)
	Assessment is one of the challenges for us, especially in the particular COVID-19 pandemic situation (TE-11)
	Assessment of assignments is a challenge as it should also be linked to the assessment being done during the exams (TE-08)
	Learning of students is not effective in online classes so assessment is also not very successful (TE-02)
	Online assessment pattern is different from physical assessment (TE-04)
Assessment in online classes	We can assess the students through assignments, as home-based assignments can be done and submitted later on. We conduct online quizzes and the items are already structured and set (TE-10)
	I uploaded all the assessment aspects on LMS like the rubric, assignments and due dates (TE-06)
	I even gave proper feedback to students during the class (TE-01)
	I trust students not to be involved with cheating (TE-02)
	I assign questions to them during online teaching and learning (TE-08)
	I prefer close book assignments in online classes (TE-03)
	I struggle to access higher-order thinking skills in online classes (TE-05)
	Proposal writing, online seminar and discussions were dominantly used during the assessment that I have done (TE-11)
	Mini-research reports, the use of quizzes, true/false, short questions, fill in the blanks are all used as part of LMS (TE-09)
	Open book assignments were also used in my online assessment (TE-07)
Ensuring the engagement of student during online teaching	I call out the name of the students to whom I do not receive a response and ask them to please respond to the question. They then respond by writing something in the chatbox, and sometimes even indicate: "Ma'am, yes, I am listening" (TE-01)
	I observe how many times they enter the discussion, how many times they ask a discussion question, they oppose the discussion group or comment on my question or each other's questions (TE-11)
	If any student is not participating, even when I'm asking any question, I keep on telling them to apply their mind to it, and sometimes I ask that kind of question again to see if they understand and when someone else gives a response I would make a follow-up and say: "Okay, so do you agree?" (TE-10)
	I always make sure that everyone is participating in the discussion (TE-02)
	I usually randomly ask questions (TE-06)
	One of the good strategies is to always show your presence in the online forum, so students can realize that you are there and are listening to them with attention (TE-05)

DISCUSSION

The study suggested several findings on online teaching during the COVID-19 time frame. However, nine findings have emerged from the collected data from TEs. These include the following: Perception of TEs about Online Classes (PTEOC), Holistic Development of Teacher Educators in ICT (HDTEICT), Readiness of Prospective Teachers about Online Classes (RPTOC), Challenges and Issues of Virtual Classes during COVID-19 (CIVCC), Teaching Instructions for Online Classes (TIO), Software Applications and Platform used for Online Classes (SAPUOC), Coping Strategies to Solve the Issues and Problems of Online Class during COVID (CSSIP), Readiness for Second Wave of COVID-19 (RSWC), and Students' Engagement and Assessment in Online Classes (SEAOC).

The first finding of this study highlighted the perception of teachers regarding online classes as TEs perceived that virtual classes do not replace physical classes because physical classes are more affected by teaching and learning than virtual classes. The same findings are supported by Astuti and Solikhah (2020) as online classes in the time of COVID-19 are not very effective because students are not familiar with digitalization. Likewise, another study suggested that students are not motivated for online classes because of their sudden shift toward virtualization (Kulal and Nayak, 2020). Additionally, Kalloo et al. (2020) support the thoughts of Astuti that online classes could not replace the social needs of learners and instructors. Likewise, Nambiar (2020) highlighted that there is a significant difference between face-to-face classes and online classes in the time of pandemic situations because students gain less in online classes as compared to physical classes. Moreover, TEs perceive online teaching not as a substitute for physical teaching because in physical classes, teachers can understand the non-verbal language of learners (Uzunboylu and Ozdamli, 2011). However, TEs have tasks and responsibilities that cannot be easily transferred when they have to switch from a face-to-face learning system to an online system with online learning experiences that have never been implemented before (Aliyyah et al., 2020).

The second finding of the study revealed that Holistic development in ICT is needed for the twenty-first century. ICT has become a part of our daily lives (Olowe and Kutelu, 2014). To get full benefits of ICT in learning for education, pre-service and in-service teachers must have the basic ICT skills and qualifications (Collis and Jung, 2003). In the time of the COVID-19 scenario, educators require more ICT skills to communicate virtually with learners. The study pointed out that some TEs themselves were inexperienced in the use of ICT during online teaching; they were lacking to record the session and they were unable to use multiple screens at a time (Rahiem, 2020). This study exposed that TEs were not ready for the sudden shift toward online classes, which is supported by Anwar et al. (2020) that learners were not ready to accept the sudden shift toward digitalization because they did not have enough resources and skills. Initially, the students and teachers were not found fully ready for online teaching (Cutri and Mena, 2020) but after training and availability of resources, they started to work. In contrast to this finding, developed countries were much more ready for online classes because they have enough

gadgets and resources to shift their classes toward digitalization (Zawacki-Richter, 2020).

It was also found that students and teachers both were facing challenges during online classes such as connectivity issues. Students were not much familiar with digitalization and they did not have a proper learning/teaching environment. Similarly, Anwar et al. (2020) highlighted that students and teachers living in remote areas were facing difficulties due to slow internet and connection problems, and people in towns also found it challenging. Moreover, Bayern (2020) reported that more than 40% of the respondents said that there were connectivity problems during COVID-19 and it had a negative impact on their life and their family member's education. The results tell some common problems that learners have encountered including loss of internet or data during an online class, inability to load content, and bad audio or video during class due to slow internet. Even some of the students did not have internet access in their homes. Many times, students had to travel a few kilometers away to some other areas to get proper and strong signals to attend their classes and submit their assignments online. This study further reveals that TEs use a student-centered approach, even in online classes, involving students in discussion forums, presentations, seminars, and group work. Likewise, the literature supports that teachers use multiple methods to conduct online classes for the betterment of learners (Babinčáková and Bernard, 2020). Some other studies present this concept in another direction that online teaching is problematic and teachers cannot create more advanced teaching strategies using the online system (Anyiendah, 2017). The finding of another study suggested that educators use different online tools for teaching, including synchronous, LMS, Zoom, WhatsApp, Google app, and asynchronous activities (Lima et al., 2020).

Teachers cope with the challenges of online teaching by making themselves available to learners and being flexible to assist them, which is supported by the fact that teachers' flexibility with time frames during online classes is much more effective because it increases the level of achievement among students (Mahmood, 2020). It was mentioned that a flexible teaching approach is essential for learning as it is important not only for students but also for teachers' professionalism (Netcom 92, 2021). In support of these ideas, Leila et al. (2021) shared her view that teachers' flexibility in the teaching process leads them to believe in the inner capabilities of learners and give them space and time to show their innovation. Additionally, the flexibility of teachers is an advantage for learners to reduce academic pressure. During online teaching, teachers were available to their students to help them in learning and for cognitive support, because some of the causal effects of COVID-19 led to connectivity issues due to a lack of internet and failure to have contact with the students for 24 h a day throughout the week (Shah, 2021).

Assessment is one of the key issues in online classes, and an aspect supported by Zulaiha et al. (2020) as they noted that assessment is the core challenge in the online teaching and learning process. Similar to this, another study indicated that assessment in e-learning is much more difficult because educators are only testing the knowledge of students (Elzainy et al., 2020). As the present study mentions that the formative assessment done during the class shows that formative assessments reflect the nature of online learning and keep students responsible for their studies. This is because the online assessments help learners to demonstrate their ability to think, analyze, and do problem-solving, which is a key benefit of the change from traditional teaching and learning with primarily teacher facilitation (Alsadoon, 2017).

IMPLICATIONS OF THE STUDY

- This study contributes to exploring the significant challenges faced by university teachers to implement e-learning during the time of the COVID-19 pandemic.
- It also explores the influencing factors of e-learning implementation used during the time of the COVID-19 pandemic.
- It is also exploring the coping strategies of university teachers to meet the challenges of e-learning implementation in Pakistan during the pandemic of COVID-19.
- This study gives the roadmap for teachers to teach differently in hard areas while learning digitally.
- It can be seen as a guide to improving the implementation of the e-learning systems among teachers and students.
- The best practices of teachers and management will be a lesson for others.

CONCLUSION

This study contributes to the significant challenges and influencing factors for e-learning used during the time of the COVID-19 pandemic. Such usage and process cover the challenges of digitalization that were not examined previously. The results of this research are based on empirical evidence, which identifies the challenges of online classes faced by university teachers. However, the university, policymakers, designers, and producers of the universities can benefit from the findings, which provide a true picture of the current learning system in the times of COVID-19. It can be seen as a guide to improving the implementation of e-learning systems among teachers.

A total of nine themes were found to analyze the current situation of online classes in Pakistan, which suggested that online assessment was the main issue. Most of the teachers use a student-centered approach during the pandemic. However, teachers were facing the challenges of ICT literacy, classroom management, and connectivity during the shift toward digitalization. Therefore, it is a suggestion for the university management to arrange training programs for TEs so that they can run online classes smoothly.

LIMITATIONS AND FUTURE DIRECTION OF THE STUDY

The study is limited to qualitative research methods, whose results cannot be generalized. Therefore, it is suggested to future researchers conduct the same study with quantitative methods for generalization. The data for the study were collected from a few universities, which can be further enhanced through future researchers to collect data from more universities, that is, public and may be private.

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 Committee of the Department of Education, SIBAU, Sukkur, Sindh, Pakistan. Patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

ZS did the introduction, literature review, result writing, and final version setting. SS did the literature review and data collection. A-MP did the instrumentation development and discussion. All authors contributed to the article and approved the submitted version.

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Global Competence in Canadian Teacher Candidates

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The purpose of the study was to determine the global competence of 115 Canadian teacher candidates using a new measurement tool. Non-parametric tests indicated several differences in self-reported global competence within individual indicators across the three areas of Exploring, Engaging, and Acting with global competence. Two indicators showed that male teacher candidates reported higher levels of global competence than did females in the Exploring and Acting areas. Teacher candidates intending to teach in middle and senior high school reported higher levels in one indicator within the Acting area. Moreover, Canadian-born teacher candidates reported higher levels of Engaging and Acting than did non-Canadian-born students across six indicators total. While there were no differences across the three areas by age, results showed that higher levels of experience in their teacher education program were associated with greater global competence across all three areas as indicated by five indicators total, with three at the Acting stage. Implications for teacher education are discussed.

Keywords: global competence, Canada, teacher candidates, teacher education, citizenship

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INTRODUCTION

In an ever more connected global community, the ability to understand, communicate, appreciate, and work collaboratively with others is of utmost importance. One of the most common ways for children to learn and develop these skills is through effective programming within their schools. Teachers are recognized as "changemakers" in our local and global communities (Rensink, 2020, p. 14), and teacher education programs therefore have the responsibility of responding to our increasingly complex world by ensuring teachers are ready to take on these roles (Sjøen, 2021). Our understanding of how to develop teacher candidates' capacity to foster global competence within their own future students, however, is still nascent. The current study took place in Canada, and it used a newly developed set of global competence rubrics (Parmigiani et al., 2021) to explore the relationships between 115 teacher candidates' global competence, demographic variables, and programmatic variables within their teacher education program. Collectively, the findings of this study enhance our knowledge of global competence in teacher candidates, raise some questions, and point to areas of programmatic improvement for the development of global competence in teacher candidates.

Defining Global Competence

We situated our research in a current definition of global competence (GC) from the Organization for Economic Co-operation and Development (OECD) framework as "a multi-dimensional

construct that requires a combination of knowledge, skills, attitudes, and values successfully applied to global issues or intercultural situations. Global issues refer to those that affect all people and have deep implications for current and future generations" (OECD, 2018, n.p.). The Asia Society/OECD (2018) identified four actions that together indicate GC in students. Students with GC:

(1) investigate the world beyond their immediate environment by examining issues of local, global, and cultural significance;
(2) recognize, understand, and appreciate the perspectives and world views of others;
(3) communicate ideas effectively with diverse audiences by engaging in open, appropriate, and effective interactions across cultures; and
(4) take action for collective well-being and sustainable development both locally and globally (p. 5).

The Asia Society/OECD (2018) proposed that GC is necessary for employment, living harmoniously in multi-cultural societies, to communicate effectively, and for sustainable development—in effect highlighting the importance of GC for students and for future society. Given the growing importance of GC in our increasingly interdependent world, teacher education programs are called upon the redesign their coursework to "development globally competent teachers who prepare today's PK-12 children for life as interconnected and interdependent world" (Ramos et al., 2021, p. 311).

Importance of Global Competence for Teachers and Teacher Candidates

At a 2020 conference, the OECD released the findings of their 2018 PISA study of the GC of 15-year-old students from 66 countries, and related scholarship has examined these findings in terms of the equity of students' school-based access to opportunities for GC development (Mostafa, 2020). "Detailed analyses of the associations between . . . ten learning activities and the nine students' attitudes and dispositions [toward GC] revealed universally positive and significant relationships, with very few exceptions" (Mostafa, 2020, p. 4). Of the participating countries, Canadian students ranked 25/66 countries in terms of the types of GC learning activities offered to them by their teachers. Specifically, Canadian students reported experiencing an average of 6 of 10 recommended types of GC learning activities, above the OECD average of 5.5, but below those offered in 24 other countries such as the Philippines, Vietnam, and Mexico (Mostafa, 2020).

The OECD findings have clear implications within teacher preparation programs, as teachers are those with direct influence over school-based opportunities for the development of their students' GC. Education not only can counter racial, ethnic, and cultural prejudice, but can also promote students caring for intercultural, global issues that result in actions that maximize sustainability and collective well-being (Mostafa, 2020). The Asia Society/OECD (2018) have recognized teachers as being at the "forefront of educating for global competence," as well as noting their "important [roles as] advocates and ambassadors who are leading the way" (p. 28). Within immersive curriculum, whole-school approaches, and school and system leadership, GC is conceptualized by OECD within an ecological model with teachers providing students with direct opportunities for growth where "the dividends of success are incalculable and . . .will multiply with each successive generation" (p. 34).

Teacher Behaviors That Contribute to Global Competence in Students

The 2018 PISA study of GC involved a series of questionnaires that linked ten specific types of learning opportunities with nine student attitudes and dispositions related to GC (Mostafa, 2020). Mostafa (2020) found that the most common activities across countries were learning about different cultures (76%) and learning how to solve conflicts with classmates (64%). Furthermore, the least common activities as reported by students across countries were learning about current events through the internet or news programming (41%) and celebrating cultural diversity during the school year.

In terms of pedagogy, most students experienced teacher-directed lessons, rather than participatory approaches to developing GC (Mostafa, 2020). Findings showed that student attitudes and dispositions toward GC were related not only to the number of types of GC learning activities to which they were exposed but also the pedagogy selected for those lessons (Mostafa, 2020). The student attitudes and dispositions examined in the 2018 PISA study included: "(1) Interest in learning about other cultures; (2) Attitudes toward immigrants; (3) Respect for people from other cultures; (4) Awareness of intercultural communication; (5) Perspective-taking ability, (6) Cognitive flexibility/adaptability; (7) Self-efficacy regarding global issues; (8) Agency regarding global issues; (9) Awareness of global issues" (Mostafa, 2020, p. 2). Specifically, Mostafa (2020) found that lessons that fostered knowledge about the interconnected nature of the world also fostered student self-efficacy for global issues. When students developed more positive dispositions toward GC, they also were more willing to learn to communicate with people from other backgrounds and to resolve conflicts. Importantly, these capacities were developed most effectively through integrated, consistent, habitual, and active pedagogy (Mostafa, 2020), including debates, discussions, games, project-based learning, and service learning—strategies that are viewed as being possible within the repertoire of "the average teacher" (Asia Society/OECD, 2018, p. 6). Implications for educators include integration of pedagogy for GC within subject areas and across them. Importantly, no matter the subject area.

> To gain global competence, students need to be actively engaged in their learning and have the time and opportunity to reflect. They need to cultivate their curiosity and ability to think critically. "They must be able to take what they learn and use it to conceptualize possible solutions to complex problems." They have to be confident in expressing their ideas, but also willing to consider the ideas of others. They need to learn to collaborate with peers from different backgrounds and different nations. (Asia Society/OECD, 2018, p. 23).

Demographic Factors Associated With Student Global Competence

Mostafa (2020) found that not all students responded in similar ways to opportunities to develop GC. Specifically, girls participated more than boys in activities related to intercultural understanding, learning about other cultures, communication, and conflict resolution. More boys than girls participated in activities where interconnectedness of countries and their economies were studied, and boys were more likely to be invited by their teachers to discuss their viewpoints on current events related to international news.

Another area where demographic differences emerged related to socio-economic profiles of the students. The PISA study (Mostafa, 2020) found that those students who indicated advantages in terms of economic, cultural, or social status also experienced a greater number of types of GC learning experiences as compared with less advantaged students.

This finding was evident in over half to the participating countries, with the largest differences observed in Australia, Canada, Hong Kong, Korea, Macao, New Zealand, Scotland, and Chinese Taipei (Mostafa, 2020).

Development of Global Competence in Teacher Candidates

There is no prescribed pathway to developing globally competent teachers (Kopish, 2016), so teacher education programs design their courses based on findings related to effective practices. Parmigiani et al. (2022a) conducted a study across 17 European countries to determine 28 teacher educators' views on the most effective way to foster GC in their TCs. Findings related to programming aspects, content, and methods. Effective programming included formal inclusion of GC as a goal of programming as well as an assigned expert for its implementation into programming, rather than treatment as a fringe topic associated with Social Studies (Shaklee and Bailey, 2012). GC was understood to include (1) multicultural and intercultural knowledge, including inclusion of immigrants and refugees; (2) skills such as communication and co-operation related to acceptance of diversity through understandings of equity, equality, and democracy as well as social justice, self-reflection, well-being, and sustainability; and (3) teaching methods that included project-based learning, workshops, and seminars. Importantly, the need to develop attitudes and responsibility related to interconnectedness of local and global interests in teacher candidates (TCs) was highlighted.

Similar to the findings of the OECD study related to fostering GC in 15-year-old students (Mostafa, 2020), the importance of attitudes, skills, reflection, and active learning were also evident in the views of teacher educators as they related to development of TC's GC (Parmigiani et al., 2021, 2022b,c). It is unlikely that a content-based course on global citizenship alone will transfer to actual teaching practice without concurrent attention to TC's skills, dispositions, active learning, and reflection (Kopish, 2016), and the pedagogy and processes of teacher educations programs are therefore integral to ensuring teacher competence to foster GC in their own students. Zhao (2010) stressed that it is the responsibility of teacher education programs to ensure that their graduates are prepared to take actions that foster GC in their future students, being as attention to TC's preparedness for this role is essential to the goals of developing globally competent teacher and student populations.

RESEARCH QUESTIONS

Given the findings about the importance of GC not only to students and teacher candidates, but also to our collective futures, and within the recognition that teachers play a key role in fostering GC, the current study examined the GC of teacher candidates in a Canadian teacher education program. Our specific research questions were:

Which demographic factors are associated with higher levels of global competence in Canadian teacher candidates (gender, country of birth, age)?

Do higher levels of global competence correlate with later stages of the teacher education program?

MATERIALS AND METHODS

Context

This research project originated as part of a larger project initiated by Parmigiani et al. (2021, 2022a,b,c). After conducting a Delphi study aimed at validation of a set of rubrics to measure TCGC, the lead researcher contacted the participants to request that they collect data in their home countries to validate the internal consistency and reliability of the three rubrics. Given that GC does not lend itself to easy assessment (Sjøen, 2021), the development and international validation of a valid and reliable set of rubrics to measure TCGC is important development in GC teacher education. The data reported here were collected in Manitoba, Canada as part of that larger study of the global competence of TCs from Portugal, Italy, Norway, Slovakia, France, Israel, Australia, United Kingdom, Germany, and United States.

The teacher education program where the current data were collected in 2022 is located in a Manitoba, a central Canadian city of almost a million people. To be certified as a teacher in this province, TCs must hold two degrees: (1) a degree in a subject area taught within the province, and (2) a Bachelor of Education (B.Ed.) degree. TCs complete these requirements either concurrently by enrolling in a 5-year integrated program or consecutively be enrolling in the B.Ed. program once their initial degree is complete. In addition, TCs must be Canadian citizens or permanent residents who have successfully completed citizenship examinations in either English or French—Canada's two official languages. The language of instruction in this B.Ed. program is English.

Permission to conduct the research was obtained from the Canadian university's Human Research Ethics Board in January 2022. During the month of February 2022, all students enrolled in the undergraduate teacher education programs (N = 1198)

received an emailed invitation to participate during the week-long data collection period. By clicking on the link in the email, they were introduced to the consent procedures and rubrics.

Participants

Of the 1198 teacher candidates who received the email to complete the rubrics, 115 began and completed the rubrics, 10% of the total TC population at this university. For a description of the demographics of the sample, please see **Table 1**. **Table 1** indicates that a majority of our sample were female teacher candidates, and this is representative of teachers' gender in North America. The sample includes a balanced representation of candidates intending to teach in elementary and secondary schools. All of the teacher candidates were proficient in English, and most were native speakers.

Instruments

Data were collected using demographic questions and the newly validated Global Competence Rubrics (Parmigiani et al., 2021, 2022b,c). Please see **Table 2**. The Global Competence Rubrics includes three areas, each indicating the level of engagement with global competence activities.

The first area includes six indicators/criteria included into four dimensions and considers the TCs' "Exploring" stage of global competence. The dimensions are: openness; intent to experience/interact; global responsibility; ethical orientation. Sample indicators/criteria include: "I'm open to knowing and learning from people from diverse backgrounds" (dimension: openness) and "I'm willing to seize opportunities to interact with people from diverse contexts" (dimension: intent to experience/interact). The Cronbach Alpha value for this Exploring area was calculated using the current sample as 0.88, indicating very good internal reliability. Unfortunately, a coding error in the online survey resulted in errors in the first 41 response sets for the Exploring area only and these data were therefore disregarded, resulting in a complete data set from 74 students for this rubric only.

The second area includes seven indicators/criteria spread into five dimensions (global self-awareness; world views, perspectives and cultural diversity; inclusion and diversity; global challenges and conditions; sustainability) and considers the TCs' "Engaging" stage of global competence. Sample indicators/criteria include: "I demonstrate awareness of diverse and multiple perspectives when teaching/practicing in classrooms with students from diverse backgrounds" (dimension: world views, perspectives and cultural diversity) and "I try to contribute to the development of a more just, peaceful, and sustainable world" (dimension: sustainability). Cronbach Alpha value for this second area was calculated using the current sample as 0.86, indicating very good internal reliability.

The third area of the Global Competence Rubrics (Parmigiani et al., 2021, 2022b,c) includes 19 indicators/criteria grouped into seven dimensions (self-reflection; professional interaction/cooperation and multilingualism; managing complex learning environments; intercultural teaching; international practice; active teaching strategies; interactive assessment strategies) and considers the TCs' "Acting" stage of global competence. Sample indicators/criteria include: "I'm able to design a learning environment that embraces cultural diversity" (dimension: intercultural teaching) and "I'm able to support students from diverse backgrounds in working together on community-based authentic projects and real-world experiences" (dimension: active teaching strategies). The Cronbach Alpha value for this third area was calculated using the current sample is 0.97, indicating excellent internal reliability.

To measure the reliability and the internal consistency of the instrument, we also calculated the coefficient ω (McDonald, 1999; Raykov and Marcoulides, 2014; Padilla and Divers, 2015; Zhang and Yuan, 2015) and the average interitem correlation (Schutte et al., 2013; De Vaus, 2014) for each area.

As shown in **Table 3**, the coefficient ω values confirm a good level of reliability as well as the average interitem correlation. The critical values for coefficient ω are similar to Cronbach Alpha values. The average interitem correlation should fall between 0.15 and 0.50 (Clark and Watson, 1995; Zmnako and Chalabi, 2019). Spiliotopoulou (2009) specified that the average interitem correlation should be included "within the range of 0.15–0.20 for outcome measures that measure broad characteristics (i.e., general constructs such as extraversion) and between 0.40 and 0.50 for those tapping narrower ones (i.e., specific constructs such as talkativeness." The second case is

TABLE 1 | Demographic information.

Variable	Variable categories	*n*
Birthyear	1971–1990	11
	1991–1997	13
	1998	18
	1999	19
	2000	17
	2001	8
	2002	12
	2003	17
Gender	Male	19
	Female	94
	Other	2
Birth country	Canada	96
	Other	19
Intended grades	Kindergarten and Primary	46
	Middle school and Secondary	57
	Vocational Education	2
	Special Education	10
Program Year	One	12
	Two	16
	Three	28
	Four	30
	Five	29
English Proficiency	Beginner	0
	Intermediate	5
	Advanced	15
	Native speaker	94

Other includes Philippines (11), Paraguay, Jamaica, DRC, Vietnam, Syria, Argentina, United States, and South Korea.

appropriate to the constructs related with global competence. Furthermore, DeVon et al. (2007) identified studies in which the average interitem correlation was considered acceptable with scores between 0.30 and 0.70.

Each indicator in all three areas of global competence asked that TCs report their responses on a 4-point scale, with "not applicable – I'm not involved in this criterion" as a fifth choice." The four choices are: (1) "emerging – I show a low willingness to explore the criterion," (2) "developing – I show a willingness to explore the criterion but they tend to give up and not to deal with it thoroughly," (3) "achieving – I thoroughly explore the criterion," and

TABLE 2A | Global competence rubrics.

Dimensions	Indicators/Criteria		Not applicable	Levels			
				Emerging	Developing	Achieving	Extending
(A) ***Area A: Global competence – exploring***							
A1 Openness	I'm open to knowing and learning from people from diverse backgrounds						
A2 Intent to experience/interact	A2a	I'm willing to experience diverse contexts					
	A2b	I'm willing to seize opportunities to interact with people from diverse contexts					
A3 Global responsibility	A3a	I feel responsibility to address ethical, social, economic and environmental challenges					
	A3b	I view the world as interconnected					
A4 Ethical orientation	I support rights, equity and social justice in different sectors such as gender, racial, religion, disability, etc.						
Free additional comments This box may be used to write additional qualitative comments							
The levels are structured as follows: *not applicable - I'm not involved in this criterion* *emerging - I show a low willingness to explore the criterion* *developing - I show a willingness to explore the criterion but tend to give up and not to deal with it thoroughly* *achieving - I thoroughly explore the criterion* *extending - I thoroughly explore, extend, and practice the criterion independently*							
(B) ***Area B: global competence – engaging.***							
B1 Global self-awareness	B1a	I'm aware of the global impact of my actions on the natural and human world					
	B1b	I'm aware of the global impact of others' actions on the natural and human world					
B2 World views, perspectives and cultural diversity	B2a	I'm aware of multiple worldviews while interacting with people from all over the world					
	B2b	I demonstrate awareness of diverse and multiple perspectives when teaching/practicing in classrooms with students from diverse backgrounds					
B3 Inclusion and diversity	I seek inclusion and integration of all students in their classroom						
B4 Global challenges and conditions	I explore resources from varied perspectives and opportunities to stay informed on local and global issues						
B5 Sustainability	I try to contribute to the development of a more just, peaceful, and sustainable world						
Free additional comments This box may be used to write additional qualitative comments							
The levels are structured as follows: *not applicable - I'm not involved in this criterion* *emerging - I show a low willingness to be engaged in the criterion* *developing - I show a willingness to be engaged in the criterion but tend to give up and not to deal with it thoroughly* *achieving - I'm thoroughly engaged in the criterion* *extending - I'm thoroughly engaged in the criterion, extend, and practice it independently*							

(C) ***Area C: Global competence – acting.***		
C1 Self-reflection	C1a	I'm able to reflect deeply on the ways that I think about myself
	C1b	I'm able to reflect deeply on the ways that I think about the curriculum design and the teaching strategies
C2 Professional interaction/ cooperation and multilingualism	C2a	I'm able to interact and cooperate with colleagues, students, parents, etc. from diverse backgrounds
	C2b	I'm able to interact and cooperate with colleagues, students, parents, etc. from diverse linguistic backgrounds
C3 Managing complex learning environments	C3a	I'm able to observe the features of several learning environments and critically analyze diverse school contexts and systems
	C3b	I'm able to create effective learning environments and manage classes with students from diverse backgrounds
	C3c	I'm able to adapt their teaching strategies to several educational situations
C4 Intercultural teaching	C4a	I'm able to design instruction that matches their students' developmental needs
	C4b	I'm able to critically examine the curriculum to determine whether it reinforces negative cultural stereotypes
	C4c	I'm able to create learning environments where everybody can develop plural multifaceted learning, considering different points of view
	C4d	I'm able to design a learning environment that embraces cultural diversity
	C4e	I'm able to use experiences and perspectives of diverse students as conduits for teaching more effectively
C5 International practice	C5a	I'm able to practice in international school contexts
	C5b	I'm able to transfer into the school system of origin what they observed during the internship/placement abroad

Free additional comments
This box may be used to write additional qualitative comments

The levels are structured as follows:
Not applicable – I'm not involved in this criterion.
Emerging – I show a low willingness to explore the criterion.
Developing – I show a willingness to explore the criterion but they tend to give up and not to deal with it thoroughly.
Achieving – I thoroughly explore the criterion.
Extending – I thoroughly explore, extend, and practice the criterion independently.

(D)		
C6 Active teaching strategies	C6a	I'm able to adopt interactive and cooperative strategies with students from diverse backgrounds
	C6b	I'm able to carry out inquiry-based models of teaching to enable students from diverse backgrounds to actively work on ideas in order to construct knowledge, solve problems, and develop their own understanding of the content
	C6c	I'm able to support students from diverse backgrounds in working together on community-based authentic projects and real-world experiences
	C6d	I'm able to develop global learning through discussions about news events occurring around the globe and to connect them to classroom subjects
C7 Interactive assessment strategies		I'm able to design and implement formative assessment methods to inform instruction with students from diverse backgrounds (self & peer assessment, portfolios, etc.)

Free additional comments
This box may be used to write additional qualitative comments

The levels are structured as follows:
Not applicable – I'm not involved in this criterion.
Emerging – I show a low willingness to explore the criterion.
Developing – I show a willingness to explore the criterion but they tend to give up and not to deal with it thoroughly.
Achieving – I thoroughly explore the criterion.
Extending – I thoroughly explore, extend, and practice the criterion independently.

(4) "extending – I thoroughly explore, extend, and practice the criterion independently." We considered this scale as an ordinal scale.

To answer the research questions in light of the ordinal nature of the rubric data based on our small sample, non-parametric analyses were conducted (Fagerland, 2012).

TABLE 3 | Reliability and internal consistency coefficients.

Area	Coefficient ω	Average interitem correlation
Exploring	0.88	0.56
Engaging	0.84	0.42
Acting	0.94	0.46

RESULTS

The first series of analyses considered the first research question related to the demographic characteristics of the participants and their relationships to the three global competence areas of Exploring, Engaging, and Acting.

Gender

A first analysis performed through an independent samples Kruskal–Wallis test indicated no significant differences in any of the three areas that we considered as dependent global competence variables by gender (p range 0.139–0.377).

Analyzing deeply the indicators/criteria of each area, however, we found a significant difference by gender for the indicator/criterion A3a (Exploring area: They feel responsibility to address ethical, social, economic and environmental challenges; included into the dimension "global responsibility"). The pairwise comparison included into the Kruskal–Wallis one-way analysis of variance showed that male students scored higher than female students (14.807; $p < 0.011$). This result has been confirmed by the Chi-square analysis. Male students more frequently than the female students indicated the highest point of the 4-point scale (extending - I thoroughly explore, extend, and practice the criterion independently). The adjusted standardized residuals, related to the 4th point of the scale and indicated in the contingency table for male and female students are, respectively, 2.4 and –2.9 (the z critical value for a 4 × 3 table is 2.39). This indicates that the expected count for female students is lower than the observed count. In addition, the observed count for male students is higher than the expected count.

Similarly, the pairwise comparison included into the Kruskal–Wallis test showed that male students scored higher than female students (462.500; $p < 0.034$) concerning the indicator/criterion C6d (Acting area: They are able to develop global learning through discussions about news events occurring around the globe and to connect them to classroom subjects; included into the dimension "active teaching strategies").

Future Intentions of Grade Level

To investigate potential differences, we grouped the student teachers into the following school categories: kindergarten and primary level, middle school and secondary level, special education, vocational education. We did not find any significant differences in the areas A (Exploring area) and B (Engaging area). However, the indicator/criterion C1a (Acting area: They are able to reflect deeply on the ways that they think about themselves, included into the dimension "self-reflection") showed that middle school and secondary student teachers scored higher on this indicator/criterion (1,532.500; $p < 0.022$).

Birth Country

To analyze thoroughly the differences regarding the country of birth, we again performed a non-parametric test (Mann–Whitney U) on individual indicators/criteria within the rubrics. These analyses highlighted the specific dimensions that caused the birth country differences concerning the areas of Engaging and Acting in global competence. See **Table 4**.

As shown in **Table 4**, non-parametric tests demonstrated that indicator/criterion B5a is the only one with a significant difference in the area B, "Engaging." The difference has been confirmed also by the Chi-square analysis (8.211; df 3; $p < 0.042$). In particular, the adjusted standardized residuals, related to the 4th point of the scale (extending – I thoroughly explore, extend, and practice the criterion independently) and indicated in the contingency table for Canadian born and non-Canadian born student teachers are, respectively, 2.3 and –2.3 (the z critical value for a 4 × 2 Table is 2.13). This indicates that the expected count for non-Canadian student teachers is lower than the observed count. In addition, the observed count for Canadian student teachers is higher than the expected count. Similarly, the non-Canadian student teachers rated more times at the 2nd point of the scale (developing – I show a willingness to explore the criterion but they tend to give up and not to deal with it thoroughly) compared to the Canadian born student teachers (respectively, the adjusted standardized residuals are –2.3 and 2.3).

In addition, **Table 3** indicated that there are five indicators/criteria that showed significant differences between Canadian born and non-Canadian born student teachers in the Acting area. In particular, these indicators/criteria are mainly included into the dimensions "intercultural teaching" and "active teaching strategies." The chi-square analysis confirmed the differences for the indicator/criterion C3b. In particular, the non-Canadian born rated more times at the 2nd point of the scale (ASR respectively 2.2 and –2.2). The difference for the dimension/criterion C4b has also been confirmed by chi-square analysis. In particular, the Canadian born student teachers rated more consistently the 4th point of the scale (ASR respectively 2.4 and –2.4). Finally, the dimension/criterion C4c showed differences in the chi-square analysis (15.370; df 3; $p < 0.002$) for the 4th point scale (ASR 2.5 and –2.5) and for the lowest point of the scale (emerging – They show a low willingness to explore the criterion). The ASR are –3.1 for Canadian born student teachers and 3.1 for non-Canadian born student teachers.

Birth Year

We did not find any significant differences in non-parametric tests with birth year as independent variable. Kruskal–Wallis test results indicated that for Area A, $H(18) = 19.82$, $p = 0.34$; for Area B, $H(20) = 14.36$, $p = 0.81$; and for Area C, $H(20) = 16.05$, $p = 0.71$.

Program Year

Focusing on the program year as independent variable, we found interesting and significant differences in all three areas in

TABLE 4 | Differences among specific dimensions by country of birth.

#	Text		U Mann–Whitney	
	Dimension	**Indicator/Criterion**	***U***	***p* <**
B5a	Sustainability	I try to contribute to the development of a more just, peaceful, and sustainable world	695.500	0.009
C3b	Managing complex learning environments	I'm able to create effective learning environments and manage classes with students from diverse backgrounds	541.000	0.022
C4b	Intercultural teaching	I'm able to critically examine the curriculum to determine whether it reinforces negative cultural stereotypes	482.500	0.007
C4c	Intercultural teaching	I'm able to create learning environments where everybody can develop plural multifaceted learning, considering different points of view	527.500	0.025
C6b	Active teaching strategies	I'm able to carry out inquiry-based models of teaching to enable students from diverse backgrounds to actively work on ideas in order to construct knowledge, solve problems, and develop their own understanding of the content	520.500	0.042
C6d	Active teaching strategies	I'm able to develop global learning through discussions about news events occurring around the globe and to connect them to classroom subjects	491.500	0.035

answer to our second research question. In the Exploring area, the indicator/criterion A3a (They feel responsibility to address ethical, social, economic, and environmental challenges; included in the dimension "global responsibility") showed differences between 1st and 5th program year (126.500; $p < 0.013$) and between 3rd and 5th program year (278.000; $p < 0.024$). In both cases, the students who were further along in their teacher education programs scored higher on this indicator/criterion.

In the Engaging area, we found differences in the indicator/criterion B2b (They demonstrate awareness of diverse and multiple perspectives when teaching/practicing in classrooms with students from diverse backgrounds, included in the dimension world views, perspectives and cultural diversity). In particular, we found significant differences between 5th program year student teachers and 2nd (309.000; $p < 0.021$), 3rd (517.000; $p < 0.025$) and 4th program year student teachers (553.500; $p < 0.020$). In all cases, the more advanced students scored higher on this indicator/criterion. In fact, the chi-square analysis revealed that the 5th program year student teachers rated more times the highest point of the 4-point scale (extending – I thoroughly explore, extend, and practice the criterion independently). The adjusted standardized residuals, related to the 4th point of the scale and indicated in the contingency table for 5th program year student teachers are 2.7 (the z critical value for a 5×4 Table is 2.64). This indicates that the observed count for these student teachers is higher than the expected count.

In the Acting area, we found differences in the indicators/criteria C1a (I'm able to reflect deeply on the ways that they think about themselves, included in the dimension self-reflection), C5b (I'm able to transfer into the school system of origin what they observed during the internship/placement abroad, included in the dimension international practice) and C7a (I'm able to design and implement formative assessment methods to inform instruction with students from diverse backgrounds [self and peer assessment, portfolios, etc.], included in the dimension interactive assessment strategies). In the first case, we found significant differences between 5th program year student teachers and 1st (246.000; $p < 0.010$) and 2nd program year student teachers (283.500; $p < 0.032$). In both cases, the students who were further along in their program scored higher on this indicator/criterion. Regarding the indicator/criterion C5b, the differences were between 5th program year student teachers and 1st (51.500; $p < 0.025$) and 3rd program year student teachers (145.500; $p < 0.032$). Again, in both cases, the more advanced students scored higher on this indicator/criterion. The analysis of the last indicator/criterion (C7a) showed differences in the chi-square contingency table. The overall Chi-square value was 24.636 with df 12 and $p < 0.017$. In particular, the 2nd program year student teachers rated more times the lowest point of the 4-point scale (emerging – I show a low willingness to explore the criterion). The adjusted standardized residuals, related to the 1st point of the scale and indicated in the contingency table for 2nd program year student teachers are 3.0 (the z critical value for a 5×4 Table is 2.64). This means that the observed count for these student teachers is much higher than the expected count.

DISCUSSION

Collectively, the findings of the current study provide some positive news, raise some questions, and point to implications and future directions.

First, the finding that students' engagement with GC increased over their program years, but not with birth year, indicates that the students are developing higher GC from specific experiences during their teacher education program rather than simply by merit of more life experience. This is a positive programmatic outcome. However, given that TCs spend their last 2 years of the B.Ed. program in pedagogy-focused courses and also spend 32 full weeks in practicum placements over the course of their program, it is concerning that they are not indicating greater actions related to GC within the later years of their programs. Only 1 of the 6 Exploring criteria, 1 of the 7 Engaging criteria, and 3 of the 19 Acting criteria show positive differences in their levels across the years of the program, leaving 27 indicators unchanged. Moreover, a key component in the OECD (2018) definition of global competence is taking responsible *actions* related to

sustainability and well-being—the third area of the rubrics. If TCs are not yet taking actions themselves, as evidenced by the lack of development differences across program years in most indicators, how can they foster the development of these actions within their own future students?

A possible reason for this finding might be the extraordinary nature of the 2 years previous to the current study's data collection period. During that time of the data collection, the TCs were attending local practicums in pandemic conditions, had been taught their university courses online for 2 years, and were excluded from opportunities for international practicum placements. International practicum is one way that TCs can develop GC (Schenker, 2019; Kerkhoff and Cloud, 2020). While international practica is considered by some to be the gold standard in this regard (Kopish, 2016). Sjøen (2021) showed that TCs over-estimate their own development of GC during international practica. These experiences can also lead to TCs developing greater ethnocentric stereotypes, particularly when the home countries and host countries of the TCs have broad cultural differences (Sjøen, 2021). The effects of international practica on GC are influenced by characteristics of the practica, for example its duration (Behrnd and Porzelt, 2012), and by characteristics of the TCs, such as their openness to learning about others (Leutwyler and Meierhans, 2016). Whether they result in positive or negative outcomes, the TCs in the current study were restricted from such opportunities by the global pandemic, and this may have affected their development of GC over the course of their program, as these opportunities are typically undertaken in the last year of programming. This is a limitation of the current study and replication within more typical, non-pandemic conditions would add to the confidence in the findings.

The restrictions on travel necessitated by the pandemic do not necessarily prevent global exchanges, however, as programs such as the International Education and Resource Network (iEARN) offer more than 100 online project-based learning activities presented in multiple language that allow teacher facilitation of intercultural collaborative projects between school children in different countries (Rensink, 2020). If TCs were introduced to these learning opportunities as part of their teacher education programs, they would have opportunities to normalize virtual learning exchanges for their own future students even within the uncertainty of the global pandemic. Moreover, each iEARN project must answer the question of how the project will improve quality of life on the planet, fostering both agency and the action stage of GC in the students who take part. Other iEARN projects involve a digital storytelling exchange, where students create and narrate a 2-minute video. In this way, students have opportunities to reduce prejudice and strengthen understanding and tolerance of others around the world. These school-based learning opportunities have been recognized as one of sixteen models of the future of education, and they are noted for their capacity of develop empathy, co-operation, negotiation, leadership, and social awareness (Rensink, 2020)—all important to the development of GC.

These types of online intercultural opportunities to develop GC are not limited to school children. A similar online opportunity for global development has been offered as part of teacher education and involved TC's examinations of museum art exhibits related to displacement and emigration (Hubard, 2020) through an inquiry-based course. Analysis of TC learning revealed gains in six themes related to GC including considering multiple perspectives, motivation to continue to learn more about global issues and different ways of life, and feeling others' experiences through sharing humanity. University courses such as this demonstrate that innovation approaches in TC education can play a similar role to international practicums in the development of TCGC, and they provide more access to equitable experiences than do cost-laden international practicum.

Second, our finding related to participants' country of birth raises some important questions. TCs born outside of Canada indicated lower scores in both engagement (one indicator) and actions (five indicators) related to CG. Indicators/criteria of difference in the Acting area are mainly included into the dimensions "intercultural teaching" and "active teaching strategies." Given that more than half of the TCs born outside of Canada were born in the Philippines—the country that indicated the highest exposure of students to teaching activities recommended for the development of GC (Mostafa, 2020)—this finding is anomalous. It might be expected that these students would demonstrate higher GC than Canadian students if they emigrated to Canada after receiving schooling in the Philippines. Alternatively, if they moved to Canada as young children and experienced the majority of their schooling in Canadian schools, we might expect there to be no significant difference between these TCs and the TCs born on Canada. The findings that the non-Canadian born TCs exhibited lower levels of both Engaging with and action related to GC will require further investigation.

Finally, the findings related to gender and global competence require examination. The differences relate to indicators in the areas Exploring and Acting. While the self-reported nature of the rubrics' procedures may have been a reflection that males tend to rate their own competence more highly than do females generally (Mayo et al., 2012), the Acting indicator and its relationship to the use of the news of current events that we found is also reflected in the PISA data: Mostafa (2020) found boys were more likely to be invited by their teachers to discuss their viewpoints on current events related to international news. It is possible that the male TCs in our study had developed their capacity for greater actions related to school-based discussions of the news as students themselves, or through facilitating these discussions on their practica as TCs. In either case, the link between teacher actions and student GC found in the PISA study (Mostafa, 2020) is supported in our study as well.

IMPLICATIONS AND FUTURE DIRECTIONS

Although we did not investigate the socio-economic status of the TCs in our study, it should be noted that the province in which the study took place is the province with Canada's long-standing, and highest child poverty rate (Frankel, 2021). Given that most of these TCs will eventually teach in Manitoba, the OECD's (2018) finding that lower socio-economic status (SES) is associated with lower exposure to teaching strategies that promote GC is of special importance. Moreover, the findings within the OECD data related to effects of SES on students' access to develop GC was highlighted as being especially evident in Canada, among several other countries. Within our study's Canadian province with the highest concentrations of children living in poverty (28.4% according to Frankel, 2021), it becomes even more imperative that teachers in Manitoba are proficient at fostering these competencies in their students. Ensuring that students from lower SES backgrounds have equal exposure to the learning activities that foster GC is dependent on the GC teaching competencies of their teachers. Although the current findings demonstrate some changes in the level of teacher candidate GC across the years of their teacher education program, the findings signal many areas where no growth is reported. These data and our findings are harbingers to the necessity for change in teacher education related to global competence.

Other implications of the findings relate to the diversity of the Canadian teaching force. Canada's birthrate has fallen to the lowest point in 15 years, with under 349,00 live births in 2020 (Statistics Canada, 2021), and this means that maintaining the economy, population, and teaching force through immigration will be the norm moving forward, at least for the foreseeable future. Attention to understanding and ameliorating the differences between the GC of Canadian-born and non-Canadian-born teachers found in the current study will be important to the skills set of the ever more diverse teaching force, the experiences of the students in schools, and ultimately to the interconnectedness of our global community.

Finally, for TCs to move from Engaging with GCs to taking actions related to GC, the expectation of these competencies within TC practica evaluation must become overt. The criteria by which we measure teacher competence is a signal of the values of teacher education programs and should reflect the values of our global community. UNESCO succinctly stated, "You measure what you treasure[1]." While many TCs have opportunities to explore and engage with GCs as part of their coursework, actions related to GC often take place outside of coursework and during practicum, both locally and globally. Given that Canada has recognized the role of teachers in developing GC in their students (Sinay and Graikinis, 2018), it is incumbent on teacher education programs to revisit their practicum evaluation criteria to ensure they include indicators of Exploring, Engaging, and—most importantly— Acting with GC, both in local and international practica. In this way, graduating teacher candidates will be vetted for their competence within the indicators for Acting with global competence, and successful TCs will be ready to take up strategies and mindsets that foster GC in their own students.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation. Requests to access the Canadian database should be directed to LS at lj.sokal@uwinnipeg.ca.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Genoa and University of Winnipeg. Informed consent was indicated by participants through their subsequent completion of the voluntary online rubrics after reading the consent materials.

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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Return to University Classrooms With Blended Learning: A Possible Post-pandemic COVID-19 Scenario

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After more than 2 years of the pandemic caused by COVID-19, a gradual return to face-to-face teaching has been taking place. Therefore, administrators need to establish procedures to facilitate and ensure the quality of teaching during this process. The purpose of this article is to describe the strengths and challenges of implementing Blended Learning (BL). The design used is consistent with a secondary investigation of a narrative review. As a result, several recommendations are presented for building institutional frameworks that enable the implementation of high-quality BL models in the context of a gradual return to face-to-face courses in higher education. From a theoretical and contextual perspective, considerations for transitioning to this model are discussed, based on lessons learned from emergency remote education. We conclude that the present post-pandemic scenario constitutes a pivotal moment for determining the way education is delivered in higher education.

Keywords: Blended Learning, higher education, education quality, lecturing learning, COVID-19

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INTRODUCTION

The COVID-19 pandemic has changed the entire context of human life. On 11 March 2020, the World Health Organization declared a global pandemic with more than 90,000 infected people in more than 60 countries (ONU, 2021). Due to this scenario, in a global attempt to contain the spread of the virus, UNESCO (2021) announced the temporary closure of educational institutions worldwide, affecting more than 91% of students (UNESCO, 2021). Higher education had to rethink academic plans as authorities, faculty, students, and workers in general could not be on university campuses. Therefore, the university education system had to be rapidly transformed to assure the continuity of the education process. During this time, emergency remote education was adopted by most institutions as the best plausible option.

Emergency remote education is a mode of instruction in which instructors adapt the content, tools, and the traditional teaching and learning processes to online education (Bustamante, 2020). In addition, it has recently been defined as an alternative form of instruction developed with the goal of quickly and reliably continue the teaching and learning processes during an emergency or crisis (Hodges et al., 2020). This has led to the transformation of traditional learning environments into online learning scenarios, requiring teachers and students to acquire digital skills and competencies, implying the continuous implementation of educational innovations.

In this context, teachers faced the major challenge of adapting their course plan and design in a virtual format in a short period of time, in some cases with little institutional resources and/or pedagogical capabilities (Bozkurt and Sharma, 2020). This implied that the teaching staff had to adapt their learning resources and activities, as well as their assessment processes, to a new teaching scenario. However, due to the pressing need in which the virtualization process was carried out, lack of careful planning and implementation of the adaptation process has been reported. As a result, teachers did not take full advantage of the online format (Bozkurt and Sharma, 2020; Hodges et al., 2020; García-Morales et al., 2021). Therefore, teachers still need to receive technological and pedagogical support from their institutions to achieve an appropriate integration of technology in the classroom to progress from emergency remote teaching to quality online education.

At present, it is difficult to predict how the post-pandemic education will take place in the medium-term. However, it is expected that online education will be a component of teaching and learning process. The experience during the pandemic has provided progress in the implementation of virtual education, highlighting the importance of creating flexible and versatile learning environments. Therefore, future learning environments should combine traditional face-to-face teaching with technological tools and online learning (Gómez, 2020; Kuklinski and Cobo, 2020), with the appropriate institutional support to ensure a high-quality process. Blended Learning (BL) emerges as an appropriate model to address this challenge. Hybrid or blended forms may help improve the quality of face-to-face teaching by moving content delivery online and focusing in-person sessions on active learning (Murphy, 2020). BL represents a remarkable opportunity to incorporate new resources, strategies, and learning spaces into the teaching and learning process, enabling a transformation in higher education. On the other hand, United Nations Organization includes quality education among the 17 Sustainable Development Goals (ONU, 2015). Quality education is a key element for the sustainable development of the countries, necessary for the growth of today's society (Daniela et al., 2018). In this context, universities can contribute positively to the sustainable development of societies. The role of higher education institutions goes beyond increasing the number of students. Thus, universities should focus on the development of quality education guided by three missions: teaching and learning, scientific research, and service to the community (Owens, 2017).

The conceptualization of BL, its strengths, and challenges. The construction of an institutional framework for the implementation of BL from a theoretical and contextual perspective is discussed. This construction provides key elements to consider for the implementation of a high-quality BL model in the context of a gradual return to face-to-face instruction after the pandemic.

The aim of the present study is to describe, through a secondary narrative review research (Salinas, 2020). Narrative reviews correspond to research that aims to describe and discuss the development of a particular topic, from a theoretical or contextual point of view (Byrne, 2016). The research question that based this study was What are the benefits and obstacles of implementing blended learning in Higher Education in the post-pandemic scenario? The search for scientific articles was conducted from the Web of Science database. The descriptors "blended learning" (Title) and "Higher Education" (Title) were used in a first search, resulting in a total of 171 documents. Subsequently, a new iteration was performed considering descriptors associated with the pandemic, the search being as follows: "Blended Learning" (Title) and "Higher Education" (Title), and "COVID-19" OR "coronavirus" OR "2019-ncov" OR "sars-cov-2" OR "cov-19" (All Fields), this resulted in 7 documents, generating a total of 178 records (see **Figure 1**). The search covered until December 2021. The titles and abstracts of all articles identified in the electronic search were reviewed, producing the list of selected articles of interest to be included in the study according to the objectives for the article construction.

PROBLEMATIZATION OF BLENDED LEARNING

The use of the term BL is relatively new in the literature (Hrastinski, 2019). BL is defined as a mode of instruction that combines face-to-face and online instruction to intentionally use strategies, technologies, and pedagogical activities that incorporate these two modalities (face-to-face and online) for the benefit of students (Bartolomé Pina, 2004; Hrastinski, 2019). Thus, this approach attempts to combine the benefits of face-to-face instruction and virtual learning (Broadbent, 2017). In addition, BL is considered an effective mode of instruction because it allows flexible, timely, and continuous learning (Brown, 2016).

The concept of BL is quite broad. Therefore, there are different definitions available to specify how virtual and face-to-face components are integrated (Driscoll, 2002; Hrastinski, 2019). According to Garrison and Kanuka (2004), "blended learning is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences." On the other hand, Watson and Murin (2014) offer an enriched version of the definition of BL as a formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace; at least in part in a supervised brick-and-mortar location away from home; and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience (Watson and Murin, 2014). A more recent definition describes BL as a model that combines multiple delivery media that are designed to complement each other and promote learning and application-learned behavior (Bruggeman et al., 2021).

When designing a course in the BL modality it should be kept in mind that online work should be as enriching as face-to-face classroom work. On the one hand, asynchronous work provides

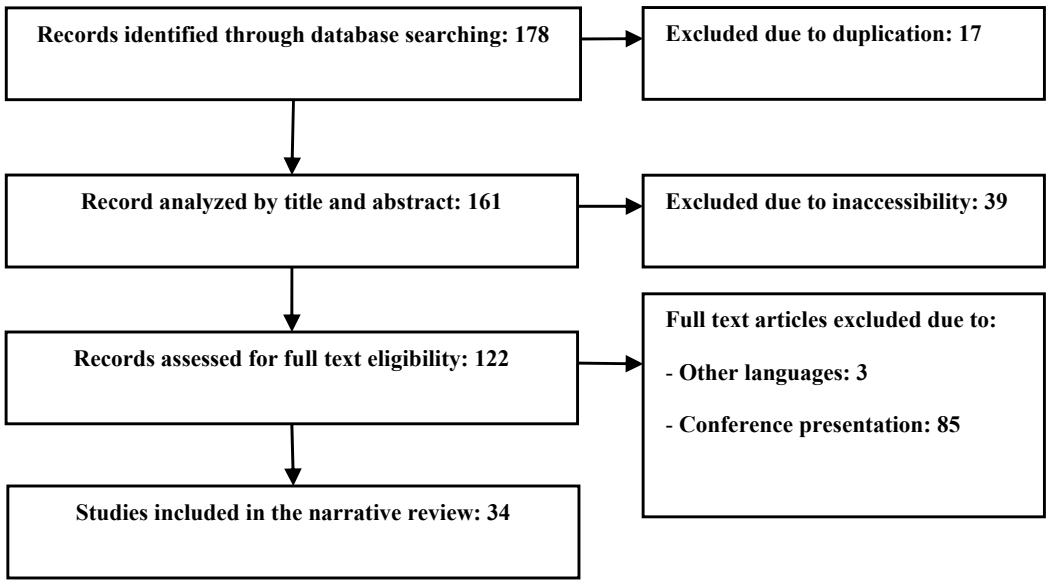

FIGURE 1 | Flow diagram on Blended Learning research in higher education.

students with the opportunity to learn independently. On the other hand, face-to-face environments encourages interaction, reflection, the development of critical thinking, provide settings for collaborative work and promotes an active attitude toward the learning process (Allan et al., 2019). Furthermore, by incorporating technological resources into the learning and teaching process, BL promotes development and innovation in both virtual and online classrooms.

Oliver and Trigwell (2005) criticized the concept BL not only for the broad nature of many previous definitions of the concept, but also because by focusing on the mode of delivery, teachers concentrated more on the teaching process than the learning process. While this criticism may not be entirely fair, it highlights the danger of integrating technology without considering how it contributes to the learning process (Oliver and Trigwell, 2005). Therefore, it is important to keep in mind that BL is not only a framework for the instructional design of a course, but also refers to the appropriate and effective use of technology to enhance teaching and learning processes (Allan et al., 2019).

In summary, we propose a definition of BL as a bimodal teaching method (face-to-face and online) in which face-to-face classes are carefully designed to use appropriate teaching strategies to facilitate the teaching and learning process. The course design should include at least 30% of the program delivered online, considering high-quality and well-organized content. In addition, a BL program seeks to integrate technologies, strategies, and pedagogical activities holistically, intentionally, and effectively, considering constituent elements such as online interactive collaboration, student control elements, linking modalities across the learning pathway. Therefore, BL cannot be considered a fixed model. Its design will vary according to institutional orientation, the didactics of the subject and the needs of the students. All these factors must be integrated into an institutional plan that is fully balanced.

STRENGTHS AND CHALLENGES FOR THE IMPLEMENTATION OF BLENDED LEARNING IN HIGHER EDUCATION

From an institutional perspective, BL is seen as an improvement in higher education since it combines the advantages of face-to-face and online teaching (Bokolo, 2021). Moreover, there is empirical evidence that a BL modality can improve student learning outcomes (Bernard et al., 2014; Vo et al., 2017). In this sense, the unique elements of BL could help to enhance students' professional and social skills.

In BL, the learning experience is improved by redesigning instruction to include new learning opportunities that are added to the face-to-face experience. Therefore, a well-designed BL program enhances student-teacher interaction during face-to-face sessions while efficiently using online time to interact with educational resources (Means et al., 2013). Interactivity includes instructor-to-student interaction, student-to-student interactions, and student-to-technology interaction (automatically graded quizzes with predefined feedback) (Singh and Thurman, 2019). One of the strengths of BL is that, if carefully designed, it provides an opportunity for students to be autonomous and active learners. This encourages self-regulated behaviors such as planning and time management (Broadbent, 2017). Similarly, BL enables the development of reflection and critical thinking and promotes interaction and collaboration between students (Ustun and Tracey, 2021). In addition, studies have reported that the use of BL in higher education is perceived by students to be better when compared to face-to-face or online-only learning (Ma and Lee, 2021).

It can be concluded that implementing BL cannot achieved by simply by adding some digital tools or resources to the learning and teaching process. In this sense, the implementation of BL requires delivering specific institutional frameworks

that guarantee the quality of the process, which needs to be outlined in accordance with institutional planning and policy (Adel and Dayan, 2021). Therefore, representing an important challenge for both teachers and higher education administrators. Consistently, a systematic review addressing the implementation of BL identified four challenges that arise in designing courses under this modality: (1) flexibility (providing an autonomous and versatile environment for students), (2) stimulating faculty-student interaction in both face-to-face and online modalities, (3) facilitating student learning by promoting self-regulation, and (4) fostering an affective learning climate that promotes positive emotions and attitudes toward the course and learning experience (Boelens et al., 2017).

From an institutional and economic perspective, the implementation of BL faces several challenges. Another systematic review found that (1) providing technology and adequate support and services to the educational community is difficult to achieve. In addition, it is important to also consider the cost of producing digital content and learning platforms. (2) Teacher training should focus on the effective use of technology, use of online materials, and effective approaches to autonomous use of technology, which is a challenge in itself (Rasheed et al., 2020). Another aspect to be considered in the proper implementation of BL concerns the spaces (physical and virtual) in which the teaching and learning processes take place. Also, a well-designed BL course will enhance students' learning experience and retention (Milheim, 2012; Poll et al., 2014). On the other hand, the need to create well-structured learning environments that clearly inform what is expected of students has been reported. Expectations should be aligned with the opportunities offered by the learning environments in order to exploit all their features and potentials.

Virtual learning environments are web-based systems that allow students to interact with teachers and peers, access learning resources at any time and place, and use information and communication technologies (Hamutoglu et al., 2020). According to Rapposelli (2014), the design of a virtual learning environment affects online participation, which in turn affects students' academic achievement (Rapposelli, 2014). Therefore, when designing a virtual learning environment, the number of offered elements is important. An excess of learning resources and activities could lead to cognitive overload, which hinders learning and reduces motivation (Hamutoglu et al., 2020). Thus, the recommendation is to create virtual learning environments that are as simple as possible and contain as few options and elements as possible. It is also important to ensure that there is a clear learning path in the virtual learning environment.

This allows students to follow a sequential and orderly learning process. In this sense, it might be beneficial to follow the suggestion of the PACIE methodology (Basantes et al., 2018). PACIE proposes to divide a course into three blocks: the starting block to present the relevant information of the course, academic blocks for displaying the content, and a final block to complete the educational process and give a formal closure to the course (Basantes et al., 2017). Moreover, virtual learning environments need to be enriched with resources that support students' learning processes. Among the most valued resources by students at the university level are lectures narrated in PowerPoint, video summaries with key concepts, and videos from platforms available on the Internet (Reed and Watmough, 2015; Hamutoglu et al., 2020). Finally, the features most requested by students include improving feedback and providing up-to-date information about changes made in the virtual learning environment (Reed and Watmough, 2015).

In context with the above, coherence must also be maintained regarding the physical space for face-to-face learning, since the way the face-to-face classroom is organized also affects how learning processes are developed and generated (Donkin and Kynn, 2021). One way in which the classroom can be organized is setting up a physical space for educational activities that have certain architectural and design features to promote active learning (Talbert and Mor-Avi, 2018). Such classroom configurations have been shown to lead to improve students' performance (Oliver-Hoyo et al., 2004; Beichner et al., 2007; Brooks and Solheim, 2014). In this sense, connectivity is identified as a crucial aspect to achieve a greater impact on students' learning. It has been reported that any architectural design, furniture, or resource that increases connectivity in any way, strengthens the impact of the active learning space (Talbert and Mor-Avi, 2018). An example is the use of adaptable furniture and chairs that allows 360° movement. This has a positive effect on collaboration between students and quickly changes the organization of the classroom (Henshaw et al., 2011). On the other hand, a polycentric organization of the classroom does not draw students' attention to the front part of the room occupied by an authority figure, but improves group cohesion and enables active learning (Soneral and Wyse, 2017). It is essential to take into account the composition of online and face-to-face learning when implementing BL since it is not only based on the simple integration of face-to-face teaching with digital media, but it involves responding to diverse learning needs according to the training requirements. This highlights BL because it supports learning patterns and learning materials that are diverse in a flexible way to assist students in their learning (Tambunan et al., 2021).

Additionally, in order to avoid academic overload and implement a successful BL program, it is also important to find a balance between face-to-face and online time. According to Allen and Seaman (2010), it is recommended that the percentage of content taught online should range from 30 to 70%. Thirty percent of online time is sufficient to eliminate the use of the internet only for downloading references and submitting assignments, while 70% is the difference between BL and a 100% online course (Allen and Seaman, 2010). Similarly, these authors emphasize that there is little understanding today of the key challenges institutions face in implementing BL programs, since research in past years has mainly focused on students and faculty, rather than institutions (Rasheed et al., 2020). Therefore, to achieve excellence in the implementation of BL, it is essential to make institutional adjustments that are led by higher education administrators. These adjustments should consider key elements such as pedagogical aptitude and faculty affinity for technology, as well as motivating faculty to adopt this modality (Antwi-Boampong, 2020). University authorities should have a deep understanding of these elements, as successful implementation of BL programs requires a comprehensive model that provides

a detailed framework and clear steps for faculty and students to facilitate the incorporation of the model (Adel and Dayan, 2021). Thus, institutions interested in implementing BL must propose an institutional perspective that serves as a guide for planning, developing, enhancing, implementing, and managing programs for their teaching staff that enables the transition to this new scenario (Bokolo, 2021).

Some studies have provided certain guidelines and directions for institutional implementation of BL. For example, Graham et al. (2013) proposes a general design that considers three stages: Awareness/Exploration, Adoption/Early Implementation, and Mature Implementation/Growth (Graham et al., 2013). Similarly, the work of Adekola et al. (2017) adds that higher education authorities need to consider the following elements when implementing BL: (1) physical infrastructure through the presence of flexible learning and virtual spaces such as virtual learning environments or digital libraries, (2) technological support for teachers through different levels of digital literacy, (3) development of pedagogical vision through the transition of old programs to new teaching and learning models, (4) university management and organizational activities, (5) the promotion of an institutional culture and ethical/legal elements such as accessibility and access equity, copyright compliance and intellectual property management (Adekola et al., 2017). More recently, and associated with emergency remote education, five principles have been proposed for the incorporation of virtuality: simplicity, accessibility, affordability, flexibility, and empathy. Affordability and flexibility are the two principles worst evaluated by students and associated with less developed countries (Cahyadi et al., 2021).

In summary, following the experience of the COVID-19 pandemic, higher education administrators need to develop and apply a range of institutional interventions to deliver successful BL programs. The development and application of institutional frameworks for BL will enable the creation of an adapted and situated vision of the modality within each institutional context. Furthermore, these policies must be carefully designed and distributed to implement an appropriate teaching approach. This approach must be aligned with the technological and physical conditions of each institution, considering educational quality, socialization, and appropriation of these policies, assuring that criteria are consistent and that suitable curricular adjustments are made.

Due to the COVID-19 pandemic it has become clear that both teachers and university leaders need a high level of preparedness so that we can adapt quickly to changes in the environment, so it is important to study the technology in depth and with due diligence to balance the tensions generated in this crisis (Dhawan, 2020). In this regard, **Figure 2** presents a SWOC Analysis of blended learning a possible post-pandemic COVID-19 scenario that seeks to contribute to this aspect (see **Figure 2**).

Strengths

Blended Learning provides students with more learning opportunities, that are not supported by the traditional lectures. In face-to-face lessons students can interact directly with their teachers and peers, whereas online time is used for interacting with different resources and media that could allow them to understand specifics concept and improve their learning at their own pace (Brown, 2016).

In face-to-face lessons, teachers must invest their times in implementing active learning activities (Brown, 2016). This means that unidirectional and passive learning must be developed during the asynchronous component. This distribution of tasks and activities allow students to focus on applying concepts and content during face-to-face lessons that were previously studied asynchronously (Allan et al., 2019).

Weaknesses

Blended Learning requires the institution to implement a Learning Management System for virtual education. This implies to invest resources for acquiring the software and hiring employees for continuous technical support for both students and teachers. Moreover, institutions must invest time and money for training students and teachers in the use of the platform (Ashrafi et al., 2020; Dhawan, 2020).

The implementation of BL needs to consider an adaptation period for students and teachers to adopt this modality. On one hand, students need to learn how to manage their time, which requires to develop self-regulations skills. On the other hand, teachers need to learn how to use technology and how to implement active learning strategies. In both cases, people can get frustrated since they are expecting both students to be self-regulated, and teachers to be successful at implementing innovative educational strategies (Ożadowicz, 2020; Rasheed et al., 2020).

Opportunities

The implementation of BL promotes the adoption of innovative educational practices. On one hand, the online component of BL requires teachers to learn how to use new technology to guide and help students in their learning. On the other hand, the face-to-face component requires teachers to plan very efficient and student-center classes (Yang et al., 2022). BL implementation also gives the opportunity of thoroughly monitoring the learning and teaching process (Rapposelli, 2014). The advantages of a LMS allows teachers to use learning analytics to take student-center decisions that will improve their self-regulation skills, reduce dropout rates, and reduce failure (Zhang et al., 2020).

Challenges

Blended Learning implementation requires teachers to develop abilities that allows them to manage time, learning, and communication in an effective way. In traditional learning, teachers prepare and manage the curriculum considering only face-to-face lessons, whereas in BL the asynchronous component needs to be carefully designed, guiding learning during the autonomous working load otherwise left unattended. Additionally, it is expected that both face-to-face and online components are integrated in an efficient and effective way, so that students can accomplish their learning outcomes (Boelens et al., 2017; Adel and Dayan, 2021).

A successful implementation of BL requires students to have self-regulation skills since they need to perform autonomous work and organize their time to also attend face-to-face lessons. Thus, it is an important challenge for the institution to develop

STRENGHTS	WEAKNESSES
• BL provides students with more Learning opportunities, enriched in comparison to a traditional lecture. • BL promotes active learning during face-to-face lessons.	• BL requires the adoption of a LMS and massive students and teachers training. • The implementation of BL needs to consider an adaptation period in which students and teachers adjust to this modality.
OPPORTUNITIES	**CHALLENGES**
• The adoption of BL promotes innovation in education, including new ways of monitoring students' progress. • It provides the opportunity of thoroughly monitor the learning and teaching process and provide feedback and make pedagogical decisions.	• To properly combine face-to-face lessons with asynchronous work. • To develop programs that allows students to improve their self-regulation skills.

FIGURE 2 | SWOC Analysis of Blended Learning as possible post-pandemic COVID-19 scenario.

programs that allows students to improve their self-regulation skills (Broadbent, 2017).

SUGGESTIONS FOR THE IMPLEMENTATION OF BENDED LEARNING IN HIGHER EDUCATION POST COVID

Previous reports present BL as an appropriate educational model for the transition from emergency remote teaching, given that allows to benefit of what was learned during the pandemic (Megahed and Ghoneim, 2022). BL promotes the adoption of a constructivist model that contrasts with traditional face-to-face teaching. Therefore, the adoption of a BL model provides an opportunity to improve the quality of teaching and learning. Higher education institutions could guide the adoption of BL in the post-pandemic scenario. Based on the present report, some key elements are suggested:

1. Considering the broad definition of BL, an adequate use of terms to refer to specific components of e-learning or b-learning is crucial to the success in their implementation. In this context, an institutional definition should be provided, to define a common language and criteria for the implementation of an instructional BL model. To assure adaptation, the development of an institutional definition in collaboration with the educational community is suggested. Among the key elements of institutional guidelines, it is important to define the percentages of the online and face-to-face components. Moreover, clear institutional principles should accompany the process of implementation of a BL model, including the definition of the technological resources and platforms, such as LMS.
2. During the pandemic, institutions had to redesign, or at least to modify the curriculum so online classes could be implemented. In the same way, it is imperative to regulate the curricular aspects that must be considered for the implementation of a BL model. Particular attention must be paid to methodological and assessment aspects, and to avoid academic overload considering both the online and face-to-face schedule, as well as the autonomous work.
3. With the implementation of virtual classes, every educational institution around the world was forced to acquire online-related infrastructure, including software and hardware. This is an important progress for the implementation of BL. As well, the face-to-face component requires specific physical spaces for active face-to-face learning and collaborative work. Thus, institutions should revise their infrastructure and plan to guarantee suitable on-campus spaces for students to perform autonomous online work, as well as collaborative spaces for face-to-face sessions.
4. The past 2 years, educational institutions made a great effort for training faculty, especially regarding the use of LMSs and virtual tools. However, there are still some topics in which teachers must be trained to successfully implement a BL-model, such as instructional design, new teaching methodologies, new assessment tools, tools for virtual teaching, and active learning strategies for face-to-face teaching. Moreover, it is necessary to train faculty in the integration of both, virtual and face-to-face methodologies, for a successful teaching and learning process. In this context, it is essential to generate and/or maintain learning communities to share best practices, identify difficulties, and jointly seek solutions considering the institutional identity of each university.
5. It is imperative to carry out continuous institutional assessment processes to identify needs and opportunities for improvement. The assessment process must be performed systematically for safeguarding the quality of the teaching and learning process. Therefore, the assessment should include all members of the community that the institution considers relevant for the process.
6. To cover students' needs must be a priority to implement a successful BL-model. In this context, educational resources and technologies must be ensured for all students so that they have a universal access to learning material and activities. Moreover, self-regulation abilities are necessary to manage time and to use platforms and tools properly, so training for students, especially regarding

psycho-educative variables, is also required to avoid failure in this learning format.

CONCLUSION

Blended Learning corresponds to an integration of elements of face-to-face teaching with elements of e-learning, as it uses, and can benefit of both modalities to deliver instructional processes, promoting professional and social competencies in students. The urgent virtualization of academic activities due to the COVID-19 pandemic represents an opportunity for the implementation of a BL model in higher education. Therefore, it is necessary to continue and improve the development of educational platforms and processes that will enable the implementation of quality educational strategies and resources. In addition, it is crucial to continue the unprecedent training of the higher education teaching staff displayed during the sanitary emergency, now including, carefully defined criteria and institutional definitions for teaching in the post-pandemic scenario, considering the requirements that the implementation of a BL model demands.

Blended Learning is an appropriate educational model for the post-pandemic transition that incorporates what was learned during the pandemic. The combination of face-to-face lectures with technology results in environments that can increase the learning potential of students (Megahed and Ghoneim, 2022). In this context, higher education institutions could guide the adoption of BL in the post-pandemic scenario globally.

It is also necessary to progress to a constructivist model that focuses on active learning. This implies the development of generic competences in disciplinary contexts, considered an essential and relevant aspect of higher education training. BL also contributes to the development of competences for the proper use of virtual environments and technologies, nowadays a requirement for professional performance.

Despite progress in immunization practices in many countries and improved health indicators, the ideal conditions for a full face-to-face system are not yet in place. This work seeks to contribute to the review and reflection of institutional roles and recommendations for the implementation of a BL model as a proposal to implement a sustainable transformation of the university education system in a post-pandemic scenario.

DATA AVAILABILITY STATEMENT

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

AUTHOR CONTRIBUTIONS

RC-R, CB, and NC: conceptualization. NC and KL: methodology. RC-R, NC, EG, and KL: investigation and writing—original draft preparation. CB: resources and writing—review and editing. EG: visualization. RC-R and KL: supervision. CB and KL: project administration and funding acquisition. All authors contributed to the article and approved the submitted version.

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Exploring the concept of pedagogical resilience during the COVID-19 pandemic: Teachers' perspectives from Thailand and the Philippines

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This brief research report aimed to explore the concept of pedagogical resilience and how teachers in Thailand and the Philippines build resilience in pedagogy during the COVID-19 pandemic. Employing the qualitative research design, the data were obtained from the focus group discussion (FGD) and semi-structured interviews with 12 teachers, 8 of whom were from 1 of the universities in the Philippines and another four teachers from a university in Thailand. The thematic analysis revealed that pedagogical resilience is influenced by teachers' personal, professional, and social attitudes toward teaching and learning during the COVID-19 pandemic. Although teachers acknowledged that they had no experience in remote and online teaching, they demonstrated resiliency by being flexible and adaptive to the situation. Such an attitude allowed them to build a relationship with their colleagues and design teaching and learning pedagogy that addresses the issues in their online and remote teaching. The findings provide a clear understanding of the conceptualization of pedagogical resilience from the perspectives of teachers in the Philippines and Thailand.

KEYWORDS

pedagogical resilience, ASEAN teachers, higher education institutions (HEIs), COVID-19 pandemic, remote teaching and online learning

Introduction

The COVID-19 pandemic has undoubtedly impacted the educational systems worldwide (Raghunathan et al., 2022), where various educational institutions have had to find alternative modalities to continue delivering class instructions. As a result, classes were moved to online, and lessons were delivered remotely, significantly affecting

teachers' pedagogical practices and mental health. Previous studies reported that teachers experienced stress, anxiety, and depression during the COVID-19 pandemic (Aperribai et al., 2020; Jakubowski and Sitko-Dominik, 2021; Santamaría et al., 2021; Kim et al., 2022) since they were unprepared for the sudden transition from face-to-face classroom teaching to remote or online teaching. In a study conducted by Santamaría et al. (2021) in Spain, where the researchers identified the stress levels, anxiety, and depression among 1,633 teachers, it was found that teachers demonstrated a high percentage of stress symptoms, anxiety, and depression because of the unclear guidelines, new measures, and insecurities brought about by the COVID-19. Although such health issues teachers experienced were primarily caused by the COVID-19 pandemic, some pedagogical challenges also contributed to teachers' negative mental wellbeing (see Pokhrel and Chhetri, 2021; Ulla and Achivar, 2021; Ulla and Perales, 2021b). Factors like the lack of teacher skills and knowledge in conducting remote or online teaching, the lack of internet connectivity, gadgets, and other devices, the challenges in making the teaching materials suitable for online and remote teaching and learning environments, the availability of a teaching and learning platform, and the issue on what teaching methodology and strategy will work online or remotely (Pokhrel and Chhetri, 2021; Ulla and Achivar, 2021; Ulla and Perales, 2021a).

However, despite the drastic, inevitable changes in the educational landscape and mental health issues among teachers during the COVID-19 pandemic, teachers have had to continue delivering their lessons and providing learning support to their learners. Likewise, schools and universities adjusted the teaching and learning process to adapt to the educational needs during the COVID-19 pandemic. Although some schools had no learning management systems (Ulla and Achivar, 2021; Ulla and Perales, 2021a), they subscribed to paid online platforms such as Zoom and utilized other platforms like Moodle and Microsoft teams. Using these platforms, teachers conducted asynchronous and synchronous teaching. Other schools utilize social media networks not only to support and reach out to learners in their remote learning but also as teaching and learning platforms (Aduba and Mayowa-Adebara, 2022). Thus, some teachers acknowledged that their teaching experience during the COVID-19 pandemic was a learning one and considered it one of their professional development activities (Ulla and Perales, 2021b).

Considering how teachers managed their pedagogical practices despite facing and experiencing a number of issues in the remote and online teaching and learning process, it can be said that teachers withstood the challenges since they have had to continue teaching and be committed to the teaching profession. Such an attitude is defined by Searing et al. (2021) as resiliency, describing someone who has "the ability to withstand adverse conditions while still delivering services" (p. 181). As noted by Raghunathan et al. (2022), the resiliency of an educational system in the pandemic can be portrayed in three aspects: people, technology, and environment. The first aspect, the people, are the ones who are tested and challenged the most. Specifically, teachers are the ones who are directly affected by the sudden transition to remote and online teaching.

Since teachers are considered the soul of teaching (Gao and Cui, 2022), it is deemed important to explore how they build pedagogical resilience and perceive the concept of pedagogical resilience during the teaching and learning process in the COVID-19 pandemic. Such studies can inform other teachers, policy-makers, and school administrators to develop strategies and policies that benefit teachers and the schools. Although there has been a number of studies that examined teachers' resiliency (see Mrstik et al., 2019; Entesari et al., 2020; Ratanasiripong et al., 2020), studies that examined how teachers perceived pedagogical resilience, and how teachers build resilience in pedagogy during the COVID-19 pandemic are scarce.

This brief research report explores the concept of pedagogical resilience in education during the COVID-19 pandemic from the perspectives of higher education institutions (HEIs) in the Philippines and Thailand and how these teachers build resiliency in their pedagogical practices. It seeks to answer the following questions:

1. How do teachers perceive pedagogical resilience during the COVID-19 pandemic?
2. How is pedagogical resilience reflected in teachers' teaching design?

Methodology

Employing the qualitative research design and phenomenology as a method (Groenewald, 2004), this report is part of the larger study on teachers' perceptions of pedagogical resilience among university academics in Thailand and the Philippines. Semi-structured interviews and focus group discussions (FGDs) were used to collect the data.

As a qualitative research methodological design, phenomenology aims to describe and understand participants' lived experiences of a particular phenomenon (Groenewald, 2004; Ulla and Perales, 2021a). In this study, teaching during the COVID-19 pandemic is a phenomenon that the researchers wanted to explore and understand how teachers' experiences shaped their perception of pedagogical resilience in remote and online teaching.

Setting and participants

Participants were part of the research project facilitated by two universities in the Philippines and Thailand. These two universities signed a memorandum of understanding (MOU)

to conduct a collaborative research project. While these two universities were from two countries in the Association of Southeast Asian Nations (ASEAN), they were located outside the countries' metropolis. However, the goal of this paper is not to compare teachers' teaching experiences during the COVID-19 pandemic. The aim is to explore how these teachers perceived pedagogical resilience.

A total of 20 prospective participants were invited and contacted through email and social media applications (such as messenger, line, etc.) to participate in the study. However, only 12 (eight from the Philippines and four from Thailand) agreed to participate in the study. Their age ranged from 30 to 50 years old and had a wide range of teaching experiences (5–15 years) in different educational fields such as English language teaching, Information Technology, Management, and Social Science. Thus, participants were teaching various general education courses in two universities.

Moreover, two of the participants held Ph.D, while 10 obtained master's degree in education. All of them had online teaching experiences of at least 1 year, if not 2 years during the COVID-19 pandemic.

As this study involved human subjects, ethical consideration was taken into account by obtaining informed consent from all the participants who agreed to volunteer. They were informed about the research objectives and ensured that their identity (by using pseudonyms T1, T2 . . . T12) and information given during the interviews and FGDs will be taken care of with confidentiality. Further, they were also given full right to withdraw as participants at any given time.

Data collection and analysis

As for the data collection, it took researchers almost 3 months to collect the whole set of data. Often, we experienced a mismatch of timing between researchers and participants since both were full-time teachers. This caused the delay in data collection. The data collection involved two phases, semi-structured interviews and FGD. Individual semi-structured interviews, which lasted for an average of 40 min, were conducted first by the researchers. This was followed by FGD after a few days. The FGD, conducted in presence of at least two researchers and 6 participants, lasted for almost 2 h. Both semi-structured interviews and FGD were conducted in English using the Zoom video conferencing tool and it was recorded for analysis. Responses were then transcribed verbatim. Transcribed data were returned to the participants individually to check for accuracy.

Data analysis was done using thematic analysis. To avoid researchers' biases, researchers agreed to perform thematic analyses separately using the guideline proposed by Braun and Clarke (2012), which includes reading and re-reading transcription, coding and collating, coding themes, and then finalizing themes. The themes that were developed from the individual analysis were discussed and finalized in a group's research meeting. This discussion was primarily done to establish the reliability and accuracy of generated themes. In doing so, three main themes and several sub-themes were developed under the pedagogical resilience of HEIs teachers during the covid pandemic.

Findings

Teachers' perception of pedagogical resilience during the COVID-19 pandemic

Although teachers acknowledged that conducting classes remotely during the COVID-19 pandemic was challenging since they did not have the experience, they perceived pedagogical resilience as the ability to be patient, act immediately, and adapt to the changing landscape in education during a health crisis. Such perceptions allowed them to design their teaching and learning environment that is relevant and according to the needs of the COVID-19 situation. For instance,

> *To be honest, I do not have an experience in conducting an online class. At first, I was not sure of what I was going to do. But, I was very patient with the sudden change of the teaching and learning policies during this time. I accepted the fact that this [online class] is already our reality, our new normal. So, I think the best way to deal with this is to be patient and adaptable to this new normal in education (T1).*

As can be reflected, teachers perceived and equated resilience to patience. The term resilience for them is an emotional state which signifies mental resistance to difficulties and stresses. The results further revealed that teachers' patience has considerably become one of the traits that most teachers had. It enables them to resiliently plan for how they would respond to the pandemic and how they will survive the challenges.

> *Patience makes me more resilient; it allows me to hang in there a little longer and keep going. It helped me work harder during the pandemic, which improved my self-confidence and self-esteem. As for me, patience also means resilience; being conscious of our thoughts and emotions allows us to think and make decisions properly, which is especially crucial during difficult situations (T2).*

For one teacher-participant, he perceived pedagogical resilience as being able to decide and act on the teaching and learning needs immediately during the COVID-19 pandemic. He stressed:

> *This is my first time to conduct classes remotely. When the university announced that we're going to move our classes to online teaching, I knew that I had to prepare myself and act immediately on the things that I needed to do to make my online teaching as effective as possible. This is not the time to complain because all teachers are also experiencing the same. I looked at my teaching materials and examined how could I make these materials suitable for online learning. You know, as teachers, we should be flexible (T3).*

Moreover, it can also be reflected from the responses that self-realization and clear mindset are observed and practiced among the participants. Such an attitude shows their ability to overcome challenges that also defines their being resilient individuals. The results imply that with a strong and clear mind a person can easily think of ways to survive a very stressful situation.

> *I was able to overcome challenges by first accepting the reality of the situation - I realized that things won't work if I continue to contemplate on the challenges so quickly I gathered my thoughts and resolve to use my potentials and become more realistic in going over my plans for my students, like how will I communicate to them and reach out to them and how will I still facilitate to them quality learning experiences (T4).*

Participants also responded that it was critical to capitalize on a type of responsive planning that focuses on selecting instructional modalities and feasible platforms during the COVID-19 pandemic.

> *As we faced the devastating effects of the pandemic on teaching and learning processes, we needed to devise alternative methods and mechanisms to ensure quality instruction. I wanted my students to feel good about their learning situations. For me urgency is a synthesis of thoughts, feelings, and actions (T5).*

Teacher-participant 9 supported the statement of teacher-participant 5, highlighting that planning should be done before each class start every week.

> *Early preparation of instructional materials and teaching modalities has become critical to surviving the rigorous workloads as teachers during the pandemic. One of the first things I did was I drafted a plan which included how I will be able to communicate and reach out to my students during the pandemic. I also looked into the remaining months of the academic year and adjusted the activities intended for the students. As for me, efficiency in working out with all those things really helped me to implement resilient teaching and learning strategies (T9).*

The response demonstrated the teachers' commitment to providing students with high-quality education. Despite the difficult circumstances during the pandemic, they devised a strategy that assisted them in coping and improved their odds of maintaining high-quality teaching and learning.

> *There shall always be a sense of urgency most especially during the time of anxieties and confusion. Action should immediately be implemented and done in order not to aggravate a kind of impending situation. It was an urgent call for me to adopt ways to reach out to my students, because at stake was their education (T6).*

Pedagogical resilience as reflected in teachers' teaching design

During the interview, teacher-participants also recognized some challenges in their teaching design. One of these challenges is developing teaching materials suitable for remote and online teaching. One of the teacher-participants mentioned:

> *I had to put in extra work when developing the content of educational materials because I had to consider how students would access, comprehend, and learn from them. Preparing materials during this time is really challenging because you start from the scratch. We have available materials already but those are only for face-to-face classes (T7).*

However, teachers found ways to address such an issue by establishing relationships among their co-teachers, gaining knowledge from online training, and strengthening the commitment toward the teaching profession.

> *During moments of significant struggle and challenge, I established relationships, gained knowledge, forged character, and strengthened the commitment that would eventually lead towards success. I also was able to lean into fear and find the strength and energy to act based on how I think and believe things could get better. The way I approach the challenges in teaching during the pandemic has made me more resilient (T8).*

The responses also revealed that as teachers were overcoming challenges during the COVID-19 pandemic, they also strengthened their relationships with their coworkers and developed consistent communication with them. It was also significant to note that during the pandemic, they were considering their relationship and communication with their co-workers as something that helped them to cope with the challenges. This further implies that social interaction and effective communication between individuals

in an organization is really important factors to create an atmosphere of resilience.

> *Overcoming challenges, I learned to listen to my emotions and concerns - reassure myself that it is ok to feel this way as I recognized myself coping with the pandemic and trying to make possible ways to make things normal with my students. I consulted friends and coworkers just to vent my feelings and to also ask for some assistance since it was not easy to use a whole new platform in teaching which I was totally not familiar with (T5).*

Flexibility in the teaching and learning process during the COVID-19 pandemic was also one of the attitudes held among the participants. Such flexibility also allows them to manage their teaching activities and understand their students. For instance,

> *There were many aspects of my teaching strategies and activities that I was able to flexibly adjust and improve simply because it was deemed necessary to not neglect students' learning. The majority of my teaching materials have been redesigned and reconstructed to be more tailored to what the students can easily access, understand, and remember. To adjust the approaches and methodologies in teaching I used the blended learning approach, as well as the use of technology aided instruction and contextualized modules (T9).*

One participant also shared an interesting thought about how she made herself flexible in her teaching and learning strategies.

> *The first thing I did to gather data on my students' preferences in participating and attending the class was to consult with them. I had to do this because I wanted to determine the extent of preparation and adjustments I would have to make. The consultation enlightened me about the students' chosen instructional modality and the reasons for that choice. Significantly, I was able to make flexible adjustments to my teaching and learning strategies and activities as a result of the consultation (T10).*

Participants also revealed that, while their respective schools were making significant adjustments during the transition of classes to remote and online teaching, they demonstrated a strong commitment to finding alternative ways to implement meaningful and relevant teaching and learning strategies. This is evident in the following excerpt:

> *I have become very committed to equipping myself with the knowledge and skills needed to use online platforms, which aided the teaching and learning activities that I provided to her students (T11).*

Participants also perceived that pedagogical resilience means a commitment to teaching during the COVID-19 pandemic by improving oneself.

> *I stayed committed to realigning my teaching and learning practices with the requirements of my learners. In order to become familiar with certain new approaches and trends in facilitating quality teaching and learning in the midst of the pandemic, I had to attend a number of training sessions and seminars (T12).*

The strategies for teaching and learning were also described as naturally learner-centered. As participants in both countries adapted to the effects of the COVID-19 pandemic on higher education, they made their teaching and learning processes and practices more learner-centered. One participant shared:

> *I had to navigate a variety of alternatives while still meeting the demands and needs of my students' learning. The majority of online strategies have been focused on the facilitation of activities that can be done individually or in groups. I was considering how I could reach out to students who were struggling with blended instruction due to a variety of issues, including poor internet connectivity. For me, the truest sense of learner-centered instruction is realized when students can still cope with adversity and demonstrate practical and lifelong learning outcomes (T5).*

The finding also reflects that even in the most difficult times the pursuit for a learner-centered approach can still be sustained. This characteristic of teaching and learning processes has to be promoted as always, since the core concern of education is the learners. Reinventing strategies and approaches may help teachers to stay in the lime light of relevant and responsive instruction. Teacher 8 mentioned:

> *"I considered putting aside my favorite unit plans and tried-and-true classroom management strategies to learn new teaching methods that are better suited to current circumstances was the first step I took toward making the teaching and learning strategies completely learner-centered. Also, I had to deliver direct education through pre-recorded online videos, allowing my students to focus on personal check-ins, group discussions, tailored feedback, and targeted instruction, for example (T8)".*

Discussion

This brief research report explores the concept of pedagogical resilience in education during the COVID-19 pandemic from the perspectives of HEIs in the Philippines

and Thailand and how these teachers build resiliency in their pedagogical practices. The findings revealed that teachers' pedagogical resilience in education was influenced by their personal and professional attitudes toward teaching and learning during the COVID-19 pandemic and their social relations with their colleagues and students. Such attitudes allowed them to manage their teaching and learning design, meeting the needs of the new normal in education, the online and remote teaching. These findings provide a clear understanding of the conceptualization of pedagogical resilience from the perspectives of teachers in the Philippines and Thailand.

Adapting to unforeseen changes is frequently associated with resilience. Wald et al. (2006) maintained that resilience refers to the positive adaptation and the ability to maintain or regain mental health, despite experiencing adversity. In education, the concept of resiliency has also been explored by education scholars and practitioners (see Mrstik et al., 2019; Entesari et al., 2020; Ratanasiripong et al., 2020) to describe how teachers or the curriculum adapt to and caters to the changing landscape, needs, and requirements of society. In the present study, although teachers did not have experience in conducting online and remote classes, they remained patient, flexible, and adaptive to the current teaching state of emergency remote teaching due to the COVID-19 pandemic. First, they believed that accepting and embracing the situation is essential to address the issues in online and remote teaching. As pointed out in the findings, teachers accepted the situation, clearing their minds and allowing them to think and decide on the teaching and learning activities for their students in the new teaching environment. This finding corroborated with the findings by Xun et al. (2021), emphasizing that teachers' "professional agency during the COVID-19 pandemic revolved around facilitating students' academic learning, in the new online learning environment" (p. 746). This suggests that despite their lack of online teaching experience, teachers used their professional agency to provide their learners with the best learning experience possible.

Second, they maintained and developed a community and relationships with their colleagues. Forming and building relationships with their colleagues provided them with a community where a support system was afforded. Although they faced many challenges, they drew strength from their commitment to their profession. They developed positivity on the challenges that confronted them during their teaching during the COVID-19 pandemic to provide students with a continuous learning process amidst the pandemic. Such an attitude suggests that pedagogical resilience is personal, professional, and social. In the words of Schwartzman (2020), resilience is "a combination of realistic acknowledgment of limitations and possibilities as well as determination to persist and improve... (It) describes the ongoing processes of coping with trauma in positive ways" (p. 510).

Furthermore, teachers acknowledged that they were not the only teachers affected by the sudden transition to remote and online teaching in the world. Thus, facing the issues they had may be the only way for them to address those issues. They learned to adapt to and be positive about the situation by finding solutions to the issues they faced. They also demonstrated personal and professional resilience and social resilience.

Conclusion and implications

The present study unpacks the concept of pedagogical resilience from the perspectives of university academics in Thailand and the Philippines. Employing phenomenology as a qualitative research design and FGDs and semi-structured interviews as methods, findings revealed that pedagogical resilience is a concept that participants perceived to be a positive attitude toward online and remote teaching during a health crisis. Such a positive attitude allowed teachers to design their teaching and learning environment that is relevant and according to the needs of the COVID-19 situation.

The study's findings provide implications for other schools and universities, teachers, and policy-makers not only in the ASEAN region but also globally. Teachers, who are essential people in the teaching and learning process, must be afforded activities to enhance and develop their teaching skills, emotional and mental wellbeing, and relationship with their colleagues. Teaching during the COVID-19 pandemic sees the need for teachers to be prepared pedagogically, emotionally, physically, and mentally to survive and be committed to the teaching profession. Without the support from the schools and universities, colleagues, and their commitment to the teaching profession, these teachers would not have continued remote and online teaching. Likewise, school administrators should also consider their teachers' wellbeing and that they are not alone in the sudden transition from face-to-face classes to remote and online classes.

Furthermore, while the present study offers findings that highlight teachers' perspectives of pedagogical resilience during the COVID-19 pandemic, it has its limitations. First, the findings were based on teacher-participants from two selected contexts (the Philippines and Thailand universities). Studies from other contexts would offer different perspectives on pedagogical resilience based on how teachers deal with their teaching experiences during the COVID-19 pandemic. Second, the study utilized a descriptive qualitative research design. Future research may wish to carry out a similar study using quantitative methods with a greater number of participants to corroborate the present findings. Lastly, and most importantly,

given that this study used a convenience sampling technique to recruit teacher-participants from different contexts and utilized interviews as a method, future studies may find it interesting to recruit participants from the same contexts using other qualitative methods to triangulate the data.

Data availability statement

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

Author contributions

CZ prepared the interview questions. FB wrote the literature review. TW prepared and wrote the methodology. PP helped participants recruitment. MU edited and revised the manuscript. All authors contributed to the article and approved the submitted version.

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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Supporting a statewide policy consideration: Virtual advancing educational leadership training during COVID-19

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COVID-19 pandemic was and continues to be a shock and a challenge to the entire world. This health and safety challenge found its way into the world of higher education, even in programs that were already delivered in online environments. In this study, we examined the perceptions of 79 developing principals enrolled in a Master of Education Degree program in Educational Administration at Texas A&M University in the United States as they processed the efficacy of a virtual professional development (VPD) leadership for a state certificate in Advancing Educational Leadership (AEL). The state agency has required AEL as a 3-day state-mandated face-to-face training which is a basic requirement for school leaders who evaluate teachers. In fact, per state policy, AEL was delivered in a face-to-face format since it began in 2015, but was transformed to a VPD format in 2020, for the first time, as a response to safety concerns resulting from the COVID-19 pandemic. The Texas Education Agency indicated that the training would go back to a face-to-face format after Fall 2021; however, recently the Agency determined that virtual training could continue, along with face-to-face. Initially, this study was conducted to add information to the policy consideration as to whether to leave the option open for university principal preparation programs to offer the AEL virtually or face-to-face; however, with the alteration of the policy and with the findings of the study, we now provide empirical support, based on a a concurrent triangulation mixed methods design, for the Agency's policy action. This study might be the first published in support of this AEL training policy.

KEYWORDS

advancing educational leadership, culturally responsive developing principals, educational leadership, virtual learning environments, professional development, virtual learning policy considerations, supporting a statewide policy consideration

Introduction

In March, 2020, few educators had any idea how a worldwide COVID-19 pandemic would impact their lives and the education of developing leaders in PreK-12 settings. Prioritizing safety of students and educators led to a big leap from face-to-face to virtual learning at the K-12 and college levels. Texas A&M University was no exception as the faculty members had to have an immediate response to the pandemic and move the delivery of courses and professional development (PD) including a Texas Education Agency (TEA) state-supported PD program, Advancing Educational Leadership (AEL) to be online. AEL is a 3-day PD program designed by the state education agency. Prior to COVID-19, AEL was mandatory face-to-face training and the original version of this training was under another title, Instructional Leadership Development (Region Four Education Service Center, 2022). In order to provide the training, professors or state-approved trainers must engage in a 3-day training of trainers (TOT) and be certified.

Advancing educational leadership training may be included in principal preparation programs or may be taken at state regional education service centers for the purpose of preparing principal candidates or other school leaders to become more effective as instructional leaders. School leaders who will have the responsibility of evaluating teachers are required to take this AEL PD (Texas Education Code §150.5001, Section, Texas Education Code [TEC], 2016). Completion of the AEL training is a prerequisite for becoming a certified teacher appraiser for the state's Teacher Evaluation Support System (T-TESS). Though completing the AEL and T-TESS endorsements are not a requirement for becoming a certified principal in Texas, most university programs in Educational Administration afford opportunities for graduate students to complete, at a minimum, their AEL certification prior to graduation so they will be prepared to coach and assess the instructional process.

Based on the AEL Training Manuals Advancing Educational Leadership [AEL] (2015), AEL facilitates participants' recognition of the connections and relationships between and among the major functions or strands of school leadership with five identified conceptual themes:

1. Creating Positive School Culture.
2. Establishing and Sustaining Vision, Mission, and Goals.
3. Developing Self and Others.
4. Improving Instruction, and
5. Managing Data and Processes.

These five themes are aligned to seven strands of AEL training (team building, effective conferencing, conflict resolution, goal setting, data gathering and analysis, teacher coaching and mentoring, and curriculum and instruction) and are designed to assist developing leaders in experiencing how the conceptual foundations of leadership are operationalized in a school context. The AEL framework is aligned to the new principal standards adopted by the Texas Education Agency [TEA] (2016) and further details the importance of the principal's role as an instructional leader. The purpose of this study was to determine the perceptions of the 79 principal candidates, who agreed to participate in the study from the 83 principal candidates attending the AEL VPD, related to: (a) their satisfaction with the virtual format of the AEL VPD, (b) the most interesting experience during the virtual AEL VPD, and (c) recommendations related to enhancing the quality of virtual AEL VPD that could support or refute TEA's policy implementation. Those principal candidates were, who were enrolled in a Master of Education Degree in Educational Administration at Texas A&M University in the United States.

Review of literature

We conducted a narrative review of literature (Davies, 2000) in which we reviewed studies found on principal preparation during the time period of the COVID-19 pandemic in order to construe the dominant challenges associated during that time. With this narrative review, we included periodicals, websites, and peer-reviewed journals. We searched the following databases: ERIC EBSCO, Academic Search, Pro-Quest, Google Scholar, and a general Google search with the following keywords: principal preparation programs during the pandemic, principal preparation online and COVID-19 pandemic, and online principal preparation programs during the pandemic. Only a few published articles were found specific to principal or educational leadership preparation programs, online or face-to-face, during the pandemic. Most published works that were found related to helping in-service principals to deal with the challenges of the pandemic in their schools.

Online learning had been implemented in universities in educational leadership programs in some locations around the United States long before the COVID-19 pandemic. In fact, the U.S. News and World Reports (2022) has ranked distance education graduate programs the past decade. Yet, Superville (2021) found challenges as to how the pandemic began to alter principal preparation programs. Upon interviewing four principal program national leaders, she found that the pandemic and the racial justice protests brought to light the need to diversify the principalship. She suggested that standardized testing entrance requirements could be waived or dropped, eligibility criteria could be broadened, grants and scholarships could be increased, and promising candidates could be recruited and identified by university faculty working with district administrators. Additionally, the leaders noted that preparation programs should be nimble and offer online programs that could increase racial, gender, and geographic diversity. In other

words, preparation programs can improve the content of their courses to ensure equity, social justice, and social-emotional learning (Shaked, 2018, 2020; Superville, 2021).

One of Superville's principal preparation program leader participants indicated that likely face-to-face programs would remain predominant after the pandemic, but programs may move into a hybrid format. Even so, the concept of online learning in higher education has been challenged during the COVID-19 time. For example, Hodges et al. (2020) argued that using the term, "online learning," to describe what happened as a response to the COVID-19 pandemic might not be the suitable term. Instead, they used the term, "Emergency Remote Teaching (ERT)." They explained that typically before online learning there might be time for professors to make course preparation and arrangements, which was not the case in the ERT as professors, just as did teachers in schools, had to move to online all of a sudden (Hodges et al., 2020).

In general, as was observed in daily news accounts, virtual learning in higher education settings increased by necessity during the height of the pandemic and during major surges which universities were in session. The COVID-19 pandemic did increase the numbers of higher education faculty and students using online learning as a response and solution to remote and cross-border education (Chaka, 2020). Even prior to the pandemic, Markson (2018), concluded that online leadership preparation programs could be as effective as face-to-face programs as evidenced by the scores of developing leaders on the New York licensure assessment. While he concluded that he found no statistically significant evidence that one program was better than the other, he recommended that future research examine "instructors' practices from the perspective of the students," with the goal of "revealing certain online behaviors of instructors that produced higher satisfaction and more learning among online students" (p. 38). Additionally, Irby et al. (2020) prior to the pandemic reported on an online principal preparation program, which was grant-funded (Project Preparing Academic Leaders (PAL), U.S. Department of Education, T365Z170073), recruited potential school leaders in collaboration with school districts, served a diverse principal candidate pool, and shortened the time to graduation to more expeditiously accommodate the need for leaders in high-needs schools. The authors indicated that Project PAL may serve as a guide to other national program faculty who wish to work on socially responsible school leadership preparation programs serving high-needs students. Additionally, the PAL master's program had positive results with 100% pass rates on our first group of test takers on the new 268 principals' test. Project PAL is inclusive of diverse, socially responsible perspectives with bilingual/ESL courses and leadership courses, and it is completed within four semesters with three courses per semester and with practicum/residency being a yearlong (three semesters) and with an intensive summer residency included.

Purpose and research questions of the study

The purpose of this study was to determine the perceptions of the 79 principal candidates of an AEL VPD related to: (a) their levels of satisfaction with the virtual format, (b) the most interesting experience during the AEL VPD, and (c) recommendations for enhancing the quality of virtual AEL VPD that could support or refute the state education agency's policy implementation. The research questions are as follows:

(1) What is the perception of a group of principal candidates' satisfaction with the virtual format of the AEL VPD?
(2) What is the perception of a group of principal candidates related to their most interesting experience during the AEL VPD?
(3) What are participants' recommendations to enhance the quality of virtual AEL VPD that could support or refute the state education agency's policy implementation?

Theoretical framework

In this study, we used theoretical assumptions from two theories: the multimodal model theory for online education developed by Picciano (2017) and the self-directed learning (SDL, Merriam, 2001). In the multimodal model theory, Picciano explained how online education focuses on the learning community, but in a virtual format. In this, the online learning can include multiple learning components equivalent to, or may be replacing, those of the face-to-face learning environment. These components can include content, social emotional, self-paced, dialectic/questioning, evaluation/assessment, collaboration/student generated content/peer review, and reflection.

The SDL theory, similar to other adult learning theories, helps in understanding how adults construct their learning through making connections with previous knowledge and experience. Based on the SDL theory, providing adult learners with learning environments in which they can communicate their opinions; share their knowledge and reflect on the new learning content can help them to better understand new content and incorporate it with their previous knowledge (Merriam, 2001). To this end, we found that combining theoretical assumptions from the two theories provides an appropriate theoretical framework for our study. This is because the multimodal model theory helps in interpreting how different technological tools utilized in the AEL VPD such as Breakout Rooms, Chat Box, White Board, and Jamboard provided opportunities to participants to collaborate with each other in a virtual learning environment. The SDL, however, helps to explain how through such collaboration, interactions, and

reflections, which represent the core of SDL theory, participants, as adult learners, were able to construct their learning.

Materials and methods

A concurrent triangulation mixed methods design (Schoonenboom and Johnson, 2017) was used in this study. The use of mixed-methods design allows researchers to collect and analyze quantitative and qualitative data about a phenomenon (Doyle et al., 2009). However, the concurrent mixed methods design refers to how researchers can combine quantitative and qualitative research designs concurrently to triangulate for the methods in the study and not in a separate sequential order (Schoonenboom and Johnson, 2017). Schoonenboom and Johnson (2017) explained that mixed methods design is appropriate when the purpose of researchers "is to expand and strengthen a study's conclusions and, therefore, contribute to the published literature." (p. 110). A concurrent triangulation mixed methods design was appropriate for this study because we wanted to combine and analyze the quantitative and qualitative data about the perceptions of the 79 principal candidates who participants of this study related to the AEL VPD. Given the fact that it was the first time for the AEL to be delivered virtually, we wanted to provide policymakers with triangulated evidence about participants' perceptions of the AEL VPD. Recently the agency determined that virtual training could continue, along with face-to-face. Our ultimate goal is to provide empirical support for the agency's policy action. This study might be the first published for this AEL training policy. In the quantitative part of the study, we used descriptive statistics with measures of frequency (Mishra et al., 2019). Mishra et al. (2019) noted, "Frequency statistics simply count the number of times that in each variable occurs" (p. 68). This type of descriptive statistics was appropriate for the study as it allowed us to count the numbers of participants who responded to the one, 10-point Likert scale item, as shown in **Figure 1**, the 16, five-point Likert scale items and to calculate the percentages of those responses as well as the mean for each of the survey items, as displayed in **Tables 1**, **2**. In the qualitative part of the study, we used a phenomenological research approach (Paley, 2017). Paley (2017) argued that this approach allows researchers to look closer at individuals' experiences and to construct understanding of them. The phenomenological research approach was appropriate for the study as it helped us in exploring participants' experiences of the AEL VPD through analyzing triangulated sources of qualitative data obtained from participants responses to four open-ended questions in the survey as well as their entries to the chat box over the three years of the AEL VPD.

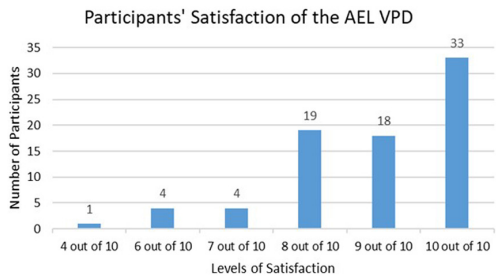

FIGURE 1
Participants' satisfaction levels with the AEL VPD.

Context of the study

As a part of a U.S. Department of Education (T365Z170073) grant, PAL (Irby et al., 2017, 2020), to support the development of bilingual school principals, 83 Master's degree students had the benefit of an experienced team to facilitate the AEL training. The grant provided an opportunity for the Master's Program faculty to think strategically and deeply about how to best support the objectives of the grant, while also focusing on how to address those objectives in a virtual environment (Irby et al., 2020). This might seem ironic in that the educational administration program was already an online program. As a result, one might assume that continuing to provide instruction online would be a simple feat. However, the state had developed AEL specifically as a face-to-face intervention, and the online training had not been tested.

The AEL professional development team decided to closely examine how best to support these common experiences in a virtual environment. The team included certified AEL trainers who are the principal investigators, two co-principal investigators, three university professors, the lead coordinator of the PAL project, the coordinator of a second U.S. Department of Education grant (1894-0008. Accelerated Preparation of Leaders for Underserved Schools (A-PLUS)), an assistant instructor for both grants, and two educational leadership doctoral students.

The intervention

On March 19, 2020, there was a total school closure across Texas due to the COVID-19 pandemic. The Texas Education Agency (TEA) made some policy adjustments in order to adjust the education services to meet this closure (Texas Education Agency [TEA], 2020). Thus, Texas A&M University and other university principal preparation programs responded to these changes by converting the face-to-face training including the AEL to be virtual. The conversion was a major undertaking; therefore, Region 13 trainers. Hosted a virtual 1-day training on May 26, 2020 and invited all AEL trainers to explain the virtual changes. The AEL team attended

TABLE 1 Descriptive results for participants' satisfaction of AEL VPD coordination.

Item description		Number agree (n) and percentage %	Number disagree (n) and percentage %	Number neutral (n) and percentage %	Mean
It was easy to participate in the AEL VPD because it was virtual	79	76/96%	1/1%	2/3%	4.59
AEL VPD saved time compared to face-to-face	79	55/69.5%	5/6.5%	19/24%	4.08
I was able to communicate with the presenters in the main room easily	79	74/94%	1/1%	4/5%	4.49
Transition between the main room and break rooms occurred smoothly	79	73/92.5%	1/1%	5/6.5%	4.56
Time allowed for AEL activities was sufficient	79	61/77%	5/6.5%	13/16.5%	4.06
The use of technology in the AEL VPD was effective	79	75/95%	0/0%	4/5%	4.65
Recording the AEL VPD sessions would allow me to review the material in the future	79	75/95%	0/0%	4/5%	4.63
I prefer the virtual PD format rather than the face-to-face	79	27/34%	17/21.5%	35/44.5%	3.25
In the future, if both virtual and face-to-face AEL PDs are offered I would recommend the virtual one to my colleagues at school	79	42/53%	10/13%	27/34%	3.68

TABLE 2 Descriptive statistics to explore satisfaction of the technological tools used in the AEL VPD.

Item description	Total no. of participants	Number agree (n) and percentage %	Number disagree (n) and percentage %	Number neutral (n) & percentage %	Mean
Chat box items					
The Chat Box allowed me to share my thoughts with everyone in the main room	79	78/99%	0/0%	1/1%	4.70
The Chat Box allowed me to communicate with colleagues privately, if needed	79	78/99%	1/1%	0/0%	4.67
The Chat Box was appropriate for activities in the AEL VPD	79	78/99%	0/0%	1/1%	4.61
Breakout rooms items					
The Break Rooms allowed for good opportunities of interactions with other colleagues	79	78/99%	0/0%	1/1%	4.86
White board item					
The White Board was an effective tool for AEL activities	79	42/53%	14/18%	23/29%	3.66
Jamboard items					
The sticky notes feature on Jam Board allowed me/my group to capture and share ideas effectively	79	77/97%	0/0%	2/3%	4.72
The Jam Board was an effective tool for the AEL activities	79	76/96%	0 0%	3/4%	4.71

the 1-day training of trainers (TOT) that helped them to adjust their roles and assignments in the 3-days of the virtual AEL VPD. These meetings were centered on comparing the virtual AEL manual and the face-to-face one to determine the changes and to specify how each activity was to be implemented in the new VPD format.

The AEL team determined the virtual changes to include: (a) the group work changed to be virtual groups in breakout rooms; (b) flash cards/sticky notes were changed to be Jamboard (on Google); (c) flipcharts became virtual whiteboard; and (d) hard copies materials and registration becomes online Google Drive folders. In the AEL of 2020, Project PAL Lead Coordinator volunteered to be the technical trainer who would use technology to facilitate the AEL embedded activities behind the scenes. To ensure that technology would run smoothly during the AEL VPD, the technical trainer hosted one-on-one meetings with the other four AEL trainers to determine the activity/activities each trainer would lead and the timeframe needed for each activity. The technical trainer helped in creating the Google folder for participants, the Powerpoint slide sequence, the virtual activities using ZOOM Breakout Rooms, White Board, polls, Chat log features, Qualtrics survey, and Google Jamboard.

Data collection

At the end of the third day of the AEL VPD, a post survey was sent to the 83 principal candidates who attended it. They were asked to complete the survey within a week, if they were interested to be part of the study. Only 79 principal candidates completed the survey. We also collected data from principal candidates' entries in the Chat Box as they responded to trainers, other participants, expressed their opinions and shared their experiences about the training activities and questions posed by other individuals. At the end of each AEL VPD, ZOOM software sent an email to the ZOOM meeting host, who was the technical trainer, with a link to the recording and attached transcripts of the Chat Box to the email. These were the two data sources used in the study.

The theoretical drive, development, and validation of the survey instrument

The survey instrument used in the study was developed based on the theoretical framework of the study that included SDL theory of adult learning (Merriam, 2001) and the multimodal model theory for online education (Picciano, 2017) as well as literature on online learning and the use of ZOOM software in teaching online courses for adult learners (Barbosa and Barbosa, 2019) and how ZOOM was a proper solution to address all of the sudden movement from face-to-face to virtual learning (Chaka, 2020). To this end, in the development of the survey items, we framed them around some of the behaviors described in the SDL theory as necessary to exist in a learning environment for adult learners in order to advance their learning experiences. Examples of those behaviors include providing adult learners with opportunities to; collaborate and communicate with each other, reflect on previous knowledge and experience and encourage them to share their thoughts and opinions about their learning. We also included in the development of the survey items on the technological tools used in the AEL VPD. This is because Picciano (2017) explained in the multimodal model theory how technological tools could provide learners with rich opportunities of learning similar to the face-to-face ones and even better.

The survey included 29 items in three sections. The first section included eight items on demographics, ethnicities, and work experience. The second section included 17 quantitative items: one, ten-point Likert scale to assess participants' levels of satisfaction of the AEL VPD. Nine items on the survey were intended to further assess participants' satisfaction of AEL VPD coordination such as time allocated for activities, the use of technology, communication among participants, and whether they would recommend AEL to continue to be virtual in the future). Seven items were intended to assess participants' perceptions of each of the technological tools used in the AEL VPD. The third section of the survey included four, open-ended qualitative questions related to the most interesting experiences participants perceived about the AEL VPD, how technological tools used in the AEL VPD were helpful, and their recommendations for enhancing the AEL VPD in the future. The four questions were: (a) what was the most interesting experience during the AEL VPD?, (b) how do you think the different technological tools (e.g., Breakout Rooms, chat box, Jamboard, White Board) assisted you in the AEL VPD?, (c) what recommendations do you have to better enhance the quality of the AEL VPD in the future?, and (d) are there any other comments about AEL VPD would you like to share?

We used two validation techniques in the survey that were; content validity and face validity (Lynn, 1986; Heale and Twycross, 2015). Content validity refers to the degree to which the instrument used covers the content it is intended to measure whereas the face validity assesses to the relevancy of the instruments to measure what it was designed for. To this end, two of the research team worked on developing the survey that was shared on Google drive where the other members of the research teams suggested edits and added comments to the document. Once the team had agreement on the final version of the survey, it was sent to participants via Qualtrics software provided by Texas A&M University.

Study sample

We employed a convenience sampling strategy (Saunders, 2012) to recruit the 79 participants for this study. Saunders (2012) defined the convenience sample as the human subjects that are available, accessible, and willing to participate in the study. The participants were from two cohorts in the educational administration program. One cohort participated in May 2020 and the second in May 2021. Of the 79 principal candidate participants, 69 were female, nine were male teachers and one selected rather not to say gender. The participants were ethnically diverse. The sample included 44 Latinx, 20 European-American, six African-American, two Asian/Asian-American, one Native-American, and six participants from other races/ethnicity. Teaching experience varied with 19 of them having 5 years of teaching experience or fewer, 24 of them having between 6 and 10 years, 22 of them having between 11 and 15 years, and 14 of them having more than 15 years of teaching experience. As for district type, 13 of the participants served in rural school districts, 36 in urban, and 30 suburban school districts.

Data analysis

To analyze the quantitative data of the study, we used descriptive statistics with measures of frequency

(Mishra et al., 2019). To this end, we used the numbers of participants' responses to each of the 17 Likert items from Qualtrics results to develop visual representations (**Figure 1** and **Tables 1**, **2**) of participants' perceptions of the AEL VPD. As shown in **Figure 1**, we created a chart on participants' levels of satisfaction using the one, ten-point Likert scale item. As for the remaining 16, five-point Likert scale items we divided them into two groups of items. The first group included nine items that were used to develop **Table 1** with descriptive statistics assessing participants' perceptions of the coordination of the AEL VPD. The second group included seven items that were used to develop **Table 2** with descriptive statistics assessing participants' perceptions of the technological tools in the AEL VPD. On the five Likert scale, we combined responses of *strongly agree* and *agree* to represent participants' agreement to each statement. Similarly, we also combined *strongly disagree* and *disagree* to represent participants' disagreement to each statement. We kept participants' responses that were *neutral* as a separate response.

To analyze the qualitative data, two members of our research team read through the qualitative data collected to make meaning and to explore descriptive codes. They worked on identifying themes that emerged from the data. The four themes were identified aligned to the research questions: (a) participants' satisfaction with the virtual format of the AEL VPD; (b) participants' perceptions of the technological tools employed during AEL VPD; (c) participants' most interesting experiences about virtual AEL Training; and (d) participants' recommendations regarding enhancing the quality of virtual AEL VPD for future AEL trainings.

We used NVivo 11 with the *nodes* feature to explore the descriptive codes and to identify the sub-themes and the main themes. Zamawe (2015) noted that NVivo has the *nodes* feature which is appropriate when researchers utilize thematic analysis. To keep the identity of participants in the study confidential, we used the pseudonym, 'TL' to refer to 'teacher leader' (the principal candidates). Since we had 79 participants, we used TL1 to TL 79 to represent all the 79 participants in the study.

Credibility and trustworthiness of the study

We also followed three main strategies to increase the credibility and trustworthiness of the study. These strategies were: (a) methods of data collection triangulation (Cope, 2014), (b) investigator triangulation (Johnson, 1997), and (c) low inference descriptors (Johnson, 1997). To triangulate for data collection, we used two data sources (participants' responses to the survey and their Chat Box entries over the 3 days of the AEL VPD), as stated earlier. Cope (2014) noted that, "With methods triangulation, the researcher uses multiple methods of data collection in an attempt to gain an articulate, comprehensive view of the phenomenon" (p. 90). Further, for the investigator triangulation (Johnson, 1997), two members of the research team worked on identifying the themes emerging from the data and having consensus on the wording. Then two other team members developed sub-themes for data analysis based on the main themes with discussions with the other research team members. As for the low inference descriptors (Johnson, 1997), we had direct quotations from what the participants reported related to their perceptions on the AEL VPD training.

To also increase the validity of the data collected from participants, we relied on the rapport that was built with participants. Building rapport is important to ensure that participants feel comfortable sharing their thoughts about a phenomenon (Cope, 2014). In our study, rapport was evident because the trainers of the AEL were professors in the master programs that principal candidates attended. This rapport helped participants to share their perceptions and recommendations about the AEL VPD.

Results

We reported results of the study based on the three research questions. The first question on participants' satisfaction of the AEL VPD was meant to be answered using the quantitative data from the survey. However, we found that some of the participants' qualitative perceptions were relevant to those questions and supported the quantitative findings; therefore, we added them to the quantitative findings of those questions, as well. As for the second and third research questions on participants' most interesting experiences during the AEL VPD, and recommendations to enhance the AEL VPD that could support or refute the state education agency's policy implementation, we used qualitative data obtained from the open-ended questions in the survey and the transcripts of the Chat Box from the 3 days of the AEL VPD.

Research question 1: What is the perception of a group of principal candidates' satisfaction with the virtual format of the advancing educational leadership virtual professional development?

To assess participants' levels of satisfaction with the virtual format of the AEL VPD, we examined participants' perceptions related to three areas: (a) participants' general satisfaction levels of the AEL VPD, (b) participants' satisfaction of the coordination of the AEL VPD, and (c) participants' satisfaction of the technological tools used in the AEL VPD. We presented findings related to those three areas as follows:

Participants' general satisfaction levels of the advancing educational leadership virtual professional development

We included a 10-point Likert scale item in the survey where number one on the scale represented the least level of participants' satisfaction and number ten represented the most. This item was, "*On a scale of 10, how would you express your satisfaction about the virtual format of the AEL training with 1 being the least satisfied and 10 the most satisfied?*" As shown in **Figure 1**, out of the 79 participants who completed the survey, 33 participants (42.%) selected number ten 18 participants (23%) selected number nine, 19 participants (24%) selected number eight, four participants (5%) selected number seven, and four participants (5%) selected number six. This means that 78 out of the 79 (99%) were satisfied with the AEL VPD and 70 participants (89%) were highly satisfied as they rated their levels of satisfaction between eight and ten. Only one participant (1%) was not satisfied about the AEL VPD as she/he selected number 4.

Participants' satisfaction of the coordination of the advancing educational leadership virtual professional development

To investigate participants' satisfaction with the coordination of the AEL AEL such as, time allocation, communication, and the use of technology, we used a group of nine five-point Likert scale items. As explained earlier in the data collection section, we collapsed the five-point Likert scale item results into three categories: disagree, neutral, and agree to have a better visual representation of them.

We used **Table 1** with descriptive statistics that included the numbers, percentages of participants who agreed, disagreed, or were neutral as well as the means of the five-point Likert scale for each of the nine items related to participants' perceptions of the AEL VPD. The nine items were: (a) it is easy to participate in the AEL VPD, because it was virtual; (b) AEL VPD saved time compared to face-to-face; (c) I was able to communicate with the presenters in the main room; (d) transition between the main room and break rooms occurred smoothly; (e) time allocated for AEL VPD activities was sufficient; (f) the use of technology in the AEL VPD was effective; (g) recording the AEL VPD sessions would allow me to review the material in the future; (h) I prefer the AEL VPD rather than the face-to-face; and (i) in the future, if both virtual and face-to-face AEL VPDs are offered, I would recommend the virtual one to my colleagues at school.

As shown in **Table 1**, participants' responses indicated that the mean value of these questions ranged from 3.25 to 4.65 which concludes that participants in general were satisfied with the AEL VPD. To give more specific examples, 76 participants (96%) agreed that it was easy for them to participate, because it was virtual with a mean of 4.59. Fifty-five participants (69.5%) agreed that it saved time compared to the face-to-face format with a mean of 4.08. Transitioning between the main room and the Breakout Rooms was perceived by 73 participants (92.5%) as occurred smoothly with a mean of 4.56. Time allowed for AEL VPD activities was perceived by 61 participants (77%) as sufficient with a mean of 4.06. Participants perceived the use of technology at the AEL VPD was effective; 75 participants (95%) agreed to that item with a mean of 4.65 and only four participants (5%) disagreed with it. The same number of participants 75 representing the same percentage (95%) agreed that recording the sessions of the AEL VPD would allow them to review the material in the future with a mean of 4.63.

Findings about participants' perceptions of VPD in general, and the AEL VPD in particular worth noting. This is because only 27 participants (34%) seemed to prefer VPD over face-to-face with the lowest mean of 3.25. However, the situation was different when participants were asked about their preference of the AEL VPD versus the face-to-face format. Forty-two participants (53%) expressed their preference of the virtual format if both virtual and face-to-face AEL PDs were to be offered in the future with mean 3.68.

In addition to the quantitative findings in which participants expressed their satisfaction about the coordination of the AEL VPD through the nine, five-point Likert scale items, participants also shared qualitative perceptions. For example, TL 4 explained that the virtual format was a proper option given the challenge of COVID and not being able to attend in person. She noted, "*I thought it (AEL VPD) was great especially since you all had to move from an in-person training to a virtual training.*"

Other participants found AEL VPD convenient to them as it saved time. For example, TL 7 reported, "*I enjoyed meeting virtually. It does save time instead of face-to-face.*" TL 39 praised coordination of the AEL VPD as it went smoothly. She said, "*You all did an absolutely AMAZING job pulling off a virtual AEL training. I know that there was a lot of prep work that took place prior to the training for it to be so smooth for the attendees.*" All in all, the participants were satisfied with the coordination of the virtual training and believed that the AEL VPD worked well for them.

Participants' satisfaction of the technological tools used in the advancing educational leadership virtual professional development

To assess participants' perceptions of the technological tools utilized in the AEL VPD, we used a group of seven, five-point Likert scale items to which the participants responded. Those seven items were: (a) the Chat Box allowed me to share my thoughts with everyone in the main room; (b) the Chat Box allowed me to communicate with colleagues privately, if needed; (c) the Chat Box was appropriate for the activities in the AEL VPD; (d) the Break Rooms allowed for good opportunities of interactions with other colleagues; (e) the White Board was an effective tool for the AEL activities; (f) the sticky notes feature on Jamboard allowed me/my group to capture ideas effectively; and (g) the Jamboard was an effective tool for the AEL activities.

As shown in **Table 2**, we reported descriptive statistics on participants' perceptions of the technological tools by including the numbers and the percentages of participants' responses to each of the seven items from the survey as well as the mean for each of those items. Also, to present participants' perceptions about the technological tools utilized in the AEL VPD in-depth, we supported the descriptive statistics associated with each tool with some of the qualitative perceptions about it. Our goal was to help the readers of the study to see how the participants perceived those technological tools as effective from quantitative and qualitative perspectives. In the following, we reported qualitative and quantitative findings on the four main technological tools used in the AEL VPD: Chat Box, Breakout Rooms, Jamboard, and White Board.

Technological tool: Chat box

Quantitative data indicated that participants perceived the Chat Box as an effective tool that allowed them to share their thoughts comfortably. There were three items on the survey related to the use of the Chat Box. Seventy- eight participants (99%), with a mean of 4.70, agreed the Chat Box was appropriate for the activities in the AEL VPD with a mean of 4.67. The second item related to the Chat Box asked participants' opinions about if they were able to communicate with colleagues privately if needed; 78 participants (99%) agreed with a mean of 4.67. The third item on the Chat Box was related to perceiving the Chat Box was appropriate for activities in the AEL VPD; 78 participants (99%) agreed with this survey item with a mean of 4.61.

The qualitative findings about participants' perceptions of the Chat Box were similar to the quantitative ones. For example, TL 21 said, "*The chat box allowed everyone to participate and have their voice heard. It allowed everyone an opportunity to share thoughts, without the face-to-face intimidations that sometimes we can feel.*" Similar to this, TL 40 explained how the Chat Box advanced her engagement with a larger group of participants where she was able to interact with others without interrupting presenters or distracting attendees. She said:

> *Chat Box allowed us to process during the training and engage with everyone in the training versus talking to your neighbor at the table in an in person setting which can be disruptive to others. It also allowed other trainers to engage in the chat to clarify misconceptions, answer questions, affirm, extend thinking, and provide encouragement while another presenter was speaking.*

Technological tool: Breakout rooms

Participants perceived the Breakout Rooms as the most effective technological tool in the AEL VPD. There was one item on the survey assessing participants' perceptions of how the Breakout Rooms facilitated their interactions. Seventy-eight participants (99%) agreed that the Breakout Rooms allowed for good opportunities of interactions with other colleagues with a mean of 4.86.

Based on the qualitative data collected for the study, many participants also think that Breakout Rooms provided them with the most interesting experience in the training that advanced their collaborations through small group discussions. TL 9 said, "*Breakout Rooms allowed for small group interaction face to face.*" Aligned with this, TL 14 noted, "The breakout rooms were something I wasn't expecting. It definitely made the experience a lot better because I was able to talk to classmates that I probably never would have." Similar to this, TL 66 reported, "*The chat room kept me connected to other members and the instructors.*"

TL 19 explained why she thought the Breakout Rooms were the most interesting. She mentioned, "*The breakout room was in my opinion the most enjoyable part of the training because it gave us all a great opportunity to share out and listen to our peers.*" Technological Tool: Jamboard. The Jamboard was perceived by participants as an effective technological tool in the AEL VPD. There were two items on the survey related to the use of the Jamboard. The first item was related to the sticky notes, which is a feature of the Jamboard. Participants thought that sticky notes allowed them as individuals and as groups to capture and share their ideas effectively. Seventy-seven participants (97%) agreed with this survey item with a mean of 4.72. The second item on the Jamboard was related to the Jamboard being an effective tool for the AEL activities. Seventy-six participants (96%) agreed to this item with a mean of 4.71.

Qualitatively, participants highlighted that the Jamboard allowed for good communication among participants, particularly to capture and share thoughts of individuals and groups. TL 2 noted, "*The Jam Board allowed us to better communicate with our colleagues.*" TL 15 explained, "*Enjoyed the JamBoards to see new ideas and reflect on different practices.*" Similar to this, TL 23 indicated, "*The jamboard was great because we got to write our own ideas as well as see everyone else's ideas.*" TL 4 said, "*I loved the Jam Board. This was so cool and I want to use it in my personal classroom.*" While the Jamboard was perceived by the majority of participants as effective, a few participants seemed to have concerns about it. For example, TL 18 noted, "*Jamboard only allows a certain number of participants which limits its effectiveness in simultaneous interactions.*"

Technological tool: White Board

The White Board was perceived as the least effective technological tool in the AEL VPD. There was one item on the survey that assessed participants' perceptions of how the White Board was an effective tool for the AEL activities. Forty-two 42 participants (53%) agreed that the White Board was an effective tool for the AEL activities with the lowest mean of 3.66. Twenty-three participants (29%) were hesitant to evaluate its effectiveness of the White Board in the AEL VPD and, thus,

selected the neutral response on the five-point Likert scale. Fourteen participants (18%) disagree related to the White Board being an effective technological tool in the AEL VPD.

Qualitative findings on the White Board were aligned with the quantitative ones reflecting participants' perceptions that the White Board was not a very effective technological tool in the AEL VPD. Particularly, participants reported that this tool was not effective compared to the other tools used. For example, TL 1 mentioned, "*All (technological tools) were great ways to share ideas, with the exception of the White Board.*" TL 18 said, "*I had difficulty seeing the value in Whiteboard; while I understand it was to record our thoughts, This could have been achieved in a Google Doc just as easily.*" TL 46 noted, "*I enjoyed the breakout rooms and chat box, but I was not a fan of White Board or Jam Board.*" TL 77 stated, *"Some I was not familiar with at all (White Board) and was consumed by trying to use it."*

Research question 2: What is the perception of a group of principal candidates related to their most interesting experience during the advancing educational leadership virtual professional development?

When participants were asked in one of the open-ended questions in the survey about the most interesting experience of the virtual AEL VPD, participants seemed to have been divided into three groups. The first group believed collaboration with other people was their most interesting experience. The second group thought that Breakout Rooms were their most interesting experience. However, the third group shared some of the takeaways from the AEL VPD content, activities, and trainers as their most interesting experience. Thus, we developed three main themes based on what the three groups of participants believed were the most interesting as follows: (a) collaboration with different people in the AEL VPD, (b) Breakout Rooms allowed for interaction with other members, and (c) AEL training's content, activities, and trainers. In the following, we highlight some of the participants' perceptions associated with the three themes on the Breakout Rooms.

Collaboration with different people in the advancing educational leadership virtual professional development

Thirty-one participants perceived collaboration with different people as their most interesting experience in the AEL VPD. They explained how collaboration with new people, and people they know, but have not met for long, provided them with opportunities to share their thoughts and learn from each other. For example, TL 23 explained, "*Having the opportunity to meet new people and to put faces with names was great!*" TL 6 noted that the most interesting experience was "*Getting to interact with different people and have meaningful conversations.*" TL 17 stated, "*It was interesting to talk to others about the different types of campuses and how situations varied.*"

Collaboration was also perceived by some participants as adding to their own experiences. For example, TL 63 said, "*Listening to people's experiences and how they would handle the situation or problem.*" Similarly, TL 21 noted, "*Getting to communicate and collaborate with the cohort members on their experiences was great.*" Aligned with this TL 22 added, "*The ability to collaborate and discuss topics with fellow cohort members provided a unique opportunity for rich conversation.*"

Breakout rooms allowed for interaction with other members

Twenty eight participants perceived the Breakout Rooms as the most interesting aspect in the AEL VPD. They explained how those rooms provided them with the space to interact with other members in the AEL VPD. For example, TL 35 said: "*The most interesting was definitely the break rooms. It allowed for more one on one interaction and time to reflect, speak, and hear other perspectives.*" Similar to this TL 17 noted, "*I enjoyed the breakout rooms and being able to talk with all of the different cohort members that I hadn't had the chance of working with yet.*" Participants also explained how the Breakout Rooms allowed them to be more focused on working together to complete tasks. TL 37 said, "*The breakout rooms were a wonderful way to interact with a group over particular tasks or discussions. Very helpful and engaging.*"

The Breakout Rooms were also perceived by some participants as an opportunity to meet with each other in small groups, which advanced their chance to get to know each other better and learn form each other more. For example, TL 42 explained, "*I really appreciated the breakout sessions. It allowed me to make connections in small groups with others in my cohort and other cohorts. Just great.*" Similar to this TL 44 stated, "*The breakout rooms and being able to connect with other future leaders.*" TL 67 said, "*The breakout rooms allowed me to hear different experiences from others.*"

Advancing educational leadership training's content, activities, and trainers

Seventeen participants indicated that the most interesting aspect of the AEL virtual learning experience was the content of the training itself, the activities included and how the trainers facilitated those activities. To get examples of AEL training content, TL 5 indicated, "*I loved developing and learning about the vision and mission statements.*" TL 8 reported, "*I especially thought the working on critical dialogue with the coaching opportunities was interesting and powerful.*" TL 55 said, "The videos from different leaders. I was able to obtain so much in a short duration of time."

As for the AEL activities, TL 19 noted, "I enjoyed the activities the most. Learning the themes and building blocks." TL 66 reported, "The rattlesnake bits were really good. They did come out of nowhere and it was nice to brainstorm with a cohort member what needed to be done." Participants also believed that the video embedded in the AEL VPD provided rich information and some activities provided opportunities for simulation. For example, TL 55 said, "*The videos from different leaders. I was able to obtain so much in a short duration of time*."

Trainers, or professors who led the AEL VPD, were perceived by some participants as the most interesting experience in the training. Participants believed that the trainers prepared well for the training and succeeded to make it more individualized based on the needs of the trainees. For example, TL 32 noted, "I want to give a shout out to the professors too for their incredible amount of knowledge and training. Very beneficial training!" Similar to this, TL 48 said, "*The chosen professors, X and Y were great and truly provided their individual touch to the presentation.*" TL 49 noted, *"Presenters and facilitators did a great job!"* TL 77 said, *"I appreciate my professors taking the time to engage in the training with us."*

Research question 3: What are the recommendations regarding enhancing the quality of the virtual advancing educational leadership virtual professional development that could support or refute the state education agency's policy implementation?

We divided participants' recommendations into two main categories: (a) Participants' recommendations to enhance the quality of future AEL VPD and (b) Participants' recommendations that could support or refute the state education agency policy implementations. We present each of the two categories of recommendations as follows.

Participants' recommendations to enhance the quality of future advancing educational leadership virtual professional development

Participants shared recommendations for enhancing the quality of AEL VPD related to three main areas: (a) increasing time allocated for activities in Breakout Rooms, (b) adding more breaks and increasing time for breaks, and (c) sending an agenda and overview in advance.

Increasing time allocated for activities in breakout rooms

Fifteen participants recommended allocating more time for the Breakout Rooms when the AEL VPD is delivered again in the future, if possible. They thought that would give more individuals opportunities to share their opinions in each activity. TL 18 noted that, *"I would increase the time in breakouts because many times it was too short and peers got cut off in the middle of their opinions."* Similar to this TL 16, said *"Just allow more time if possible during some break out sessions as we did get cut off from time to time."* Similarly, TL 55 noted, "*Allow a little more time with some of the breakout rooms. I feel that 2 or 3 min is not enough time to fully articulate a point, strand, or theme presented.*"

Some participants recommended that trainers revisit the times allocated for each activity to make sure that assigned times are appropriate based on the time expected for participants to complete those activities in. For example, TL 31 noted, "*Time and pacing. Some areas seemed rushed, while others had too much time.*" Other participants recommended that presenters make sure that everyone is back from the Breakout Rooms before they start another activity. TL 25 said, "*I enjoyed the virtual training. There was some lag time between breakout rooms and lecture, so I would recommend for the instructor to wait a minute or two before beginning the topic.*" Similar to this TL 47 said *"Smoother transitions in different technologies and presenters."*

Adding more breaks and expanding time for current breaks

Twelve participants also recommended adding more breaks as well as expanding time allocated for current breaks. They believed that the online training was intensive and such breaks could help them cope with the information provided in it. TL 10 said, "*Maybe give 6–7 min or rest or break time every hour.*" Similar to this TL 9 noted, "*A little more break time or more frequent breaks.*" TL 37 recommended improving the schedule by allowing more time for breaks. She stated, "*Improve schedule and/or possibly more breaks, especially after lunch. After lunch there needs to be more interactive and engaging pieces.*" Similar to this, TL 46 said, "*A little more time with colleagues, and a 5-min break each other to stretch the legs.*" TL 72 noted, "*Longer breaks. There were times I needed to leave the room but was scared I'd get called on.*" Similar to this TL said 15, "*Shorter amount of time, sitting too long for 3 days looking at the computer is a bit exhausting and overwhelming.*" Some participants even asked to increase the number of days assigned for the training. For example, TL 78 noted, "*Maybe spread it out over 2 or 3 weekends? Three consecutive days was a bit difficult.*"

Sending agenda and overview in advance

Five participants recommended sending more information about the AEL Training or maybe an agenda could help attendees have a better idea about the timeline for the training. TL 20 said that, "*I think it was great the way it was. Maybe give a little overview through email before the actual first meeting.*" Another recommendation was to "*Send out agendas with times ahead of time so that attendees can be adequately prepared.*" (TL 32). Similarly TL 28 stated, "*A detailed agenda with specific times*

for breaks and lunch. Staying on schedule for the ending time." Some participants asked for the instructions of what they are expected to do in activities to be shared with them in advance so that they can get prepared and have access to those instructions during the training. For example, TL 66 suggested, "*Having a presentation that is shared with students where the instructions of what to discuss in the break room are posted. Once we left the main room, it was sometimes hard to remember what the discussion was about.*" One participant asked to have an opportunity for rehearsal on technology before the training so that they feel comfortable and are able to follow up with the training. For example, TL 17 she reported "*It felt a little disorganized, almost as if it had not been rehearsed prior. I think some practice and collaboration with running through the training would go a long way toward making the experience more seamless.*"

Participants' recommendations that could support or refute the state education agency policy implementations

*As stated earlier, p*rior to COVID-19, the delivery of the AEL PD was mandated by the state agency as a 3-day face-to-face training, and the original version of this training was under another title, Instructional Leadership Development. In 2020, due to COVID-19 restrictions, it was the first time that the state agency allowed it in a virtual format. As explained in the findings' section, participants in the study were satisfied with the AEL VPD, the coordination of and the technological tools utilized in it. This provided empirical evidence related to participants' satisfaction of the AEL VPD that supports the policy considerations of the AEL VPD being retained as deemed appropriate by the providers. To this end, we concluded the findings of the study emerged related to policy considerations as follow: (a) participants were satisfied about AEL VPD with the majority of them mostly satisfied, (b) AEL VPD was perceived by participants as easy to attend because it was in a virtual format, given some participants who have family commitments, (c) AEL VPD saved time compared to face-to-face because some participants would have to drive from remote places to the training place, since participants in the Master's program are from across Texas, (d) AEL VPD, as described in the study, facilitated communications among participants and with the trainers, (e) technology utilized in the AEL VPD was perceived as effective and appropriate for the activities included in the training, (f) Breakout Rooms were perceived as convenient for small group discussions, reflections, and sharing ideas, (g) Chat Box allowed participants to communicate with each other properly, get feedback and assistance through written texts without interrupting presenters or other participants, (h) sticky notes on Jamboard allowed participants to share individual and group thoughts, similar to gallery walks in face-to-face PDs, (i) recording AEL VPD 3-day sessions would allow participants to revisit them when needed, (j) participants stated that if both AEL VPD and face-to-face options are available in the future, they would recommend the AEL VPD option to their colleagues, (k) participants perceived collaboration in a virtual environment with diverse group of educators across Texas and how the Breakout Rooms made this collaboration most effective as their most interesting experience of the AEL VPD they attended, and (l) participants recommended increasing time allocated for activities in the Breakout Rooms, adding more breaks to the AEL VPD schedule and extending time for those breaks to be able to follow up with the AEL VPD, when presented to other participants in the future.

Discussion

In this study, we investigated a unique professional development initiative by a public university in Texas that is to deliver the AEL training as mandated by TEA for principal candidates in a virtual format for the first time. The switch from the face-to-face to the virtual format was a response to the COVID-19 Pandemic closure in 2020 informed by the Texas Governor's instructions. This sudden shift of the AEL to the virtual format is similar to what Hodges et al. (2020) described in the literature as an ERT. The decision of the virtual format was made in April 2020 by TEA to allow virtual training for a limited period of time due to the pandemic. The virtual option became available at the end of May 2020 (Texas Education Agency [TEA], 2022). Given the idea that it was the first virtual AEL, we wanted to explore the perceptions of the AEL trainees, who were bilingual teachers in the PAL master's program, related to: (a) their satisfaction with the virtual format of the AEL VPD, (b) the most interesting experience during the virtual AEL VPD, and (c) recommendations related to enhancing the quality of virtual AEL VPD that could support or refute the state education agency's policy implementation.

The AEL VPD findings actualized two theories used in the study: the multimodal model theory (Picciano, 2017) for online education and the SDL theory for adult learning (Merriam, 2001). With the AEL VPD, the instructors were able to create an online learning community, similar in its quality of instruction and interaction to, if not even better than, the face-to-face learning communities. Certainly, the AEL VPD included the same training content approved by TEA as the face-to-face AEL. Informed by Picciano (2017) online learning community, the AEL VPD succeeded in providing participants with numerous opportunities for dialogue and discussion using technology, as perceived by the participants themselves. Collaboration among participants who, as described earlier principal candidates, was also evident, along with reflection on the learning. Those rich opportunities of interaction and reflection constitute the basis of the multimodal model theory as discussed by Picciano. On the other side, the SDL theory demonstrated how adult learner participants constructed their learning through making

connections with their previous knowledge and experiences. They were provided with a virtual learning environment in which they were able to communicate, reflect, and share their opinions on the AEL VPD content and activities in ways that advanced their leadership knowledge and skills.

Participants' satisfaction with the virtual advancing educational leadership training

Participants in the study demonstrated high levels of satisfaction of the virtual format of the AEL VPD as indicated in the quantitative and qualitative findings. Many of them shared positive perceptions about the AEL VPD related to how it saved them time compared to face-to-face and provided them with opportunities of interaction. This is similar to what we found in the literature (Markson, 2018) about how well-constructed online leadership preparation programs were perceived by participants as more effective than face-to-face preparation. Those are not surprising perceptions from participants in the study given the large size of the State of Texas, where some of the PAL program's participants would have had to drive for long hours to be able to attend this mandatory training in the local university hosting it.

As for participants' satisfaction with the coordination of the AEL VDP, it was also clear, as per participants' perceptions, that the time and efforts invested by the trainers, who are professors from the local university, to ensure delivering a high quality virtual professional development worked well. This is because it was mentioned repeatedly in participants' comments that the virtual learning environment of the AEL VPD provided them with opportunities for collaboration and interaction with each other as well as simulation that they believed was even better than the face-to-face learning environment. This is also aligned with what we found in the literature related to how Markson (2018) described online principal preparation programs as effective for preparing future school leaders.

Participants were also satisfied with the technological tools used in the AEL VPD. Obviously, using ZOOM to host the AEL virtual training seemed to have been a good choice made by the trainers. This is because participants perceived the technological tools embedded in Zoom such as the Breakout Rooms and Chat Box as appropriate for the AEL VPD. This is aligned with what we found in the literature related to how ZOOM served as an effective virtual portal to teach online courses for adult learners (Barbosa and Barbosa, 2019). Participants also believed that the Jamboard, which is a Google feature, was effective to capture and share their ideas. The only technological tool that did not seem to have been perceived as effective was the White Board. Indeed, participants' perceptions of the technological tools providing them with opportunities of collaboration and reflection in an online learning community is aligned with the theoretical framework of the study (Merriam, 2001; Picciano, 2017).

Participants were satisfied with coordination and planning for the AEL VPD. In our planning for the AEL activities, we were careful to keep the same group members within the same groups in the extended activities. The reason we did so was to allow group members to pursue their discussions on those activities, and not get interrupted by changing their groups. Participants perceived this helpful as it developed trust to share opinions among members in the small groups, which contributed to advancing effectiveness of the discussions about those extended activities. On the other hand, we also used the randomized group assignment in planning for activities that needed frequent rotations among group members.

Participants believed that meeting more people during the AEL, whether members they knew in their cohort or new members from the other cohort, was an eye opening experience. This is because different people from different geographical areas and school districts across Texas seemed to have shared unique perspectives. This is aligned with (Irby et al., 2020) found regarding how a diverse principal pool can provide a rich learning environment that accommodates the needs of leaders serving in high-needs schools. At the time when participants were satisfied with most of the technological tools utilized in the AEL VPD, they did seem to have been satisfied with the White Board. As described in the findings, Jamboard sticky notes and the White Board were the Gallery on which those groups pinpointed their thoughts and opinions. While those tools were the visual representations of participants' ideas they were perceived by participants as not equality effective. Jamboard and sticky notes were perceived by the majority of participants as more appropriate for the AEL VPD compared to the White Board. Particularly, participants found Jamboard and sticky notes were more colorful. The Jamboard allowed participants to move sticky notes around and group them similar to what participants would do in the face-to-face VPD with actual sticky notes and a physical board. Participants did not like the White Board very much because it did not allow those levels of interactivity provided by the Jam Board and the sticky notes. This virtual learning environment and the tools utilized to advance interaction among participants are aligned with the MultiModal Model Theory related to how appropriate online portals assist effectively in facilitating learning (Picciano, 2017).

Participants' most interesting experiences during the advancing educational leadership virtual professional development

The three main themes associated with participants' most interesting experiences: collaboration, Breakout Roots, and AEL activities and trainers provided evidence that participants found

the AEL VPD engaging and beneficial to them. Although the switch from face-to-face to virtual learning environments was all of a sudden due to COVID-19, as described in literature by Hodges et al. (2020) as an ERT, and the AEL was not an exception, participants' perceived trainers' good preparation for the AEL VPD worked well for them.

Collaboration among participants specifically in Breakout Rooms was enriched by multiple factors: the high quality activities included in the content of the AEL, the diversity of participants as they were from different geographical areas and districts across Texas, and the relatively small numbers of participants in each of the Breakout Rooms (mostly four to five participants). Those factors enabled participants to build trust with each other and to feel confident in sharing their opinions and professional experiences related to critical leadership situations included in the AEL VPD that they would have to address in the future as school leaders. This was obvious as participants reflected on some of the challenging activities that tested their abilities for decision making. An example of those activities is the rattlesnake in which participants were asked to explain how they would behave in some tough situations that school leaders sometimes have at their schools.

The trainers also played important roles leading activities and facilitating discussions among participants. Their leadership of the AEL VPD was guided by a framework developed from the SDL theory of adult learning (Merriam, 2001). To this end, the trainers purposefully created opportunities for collaboration, reflection, and sharing thoughts and experiences among participants. The SDL theory (Merriam, 2001), which is an integrated part of the theoretical framework of this study, helped in explaining how bilingual teachers in the study, as adult learners, were able to reflect on their previous experiences and make connections to other teachers' experiences as they brainstormed and reflected together throughout the AEL activities. This contributed to advancing participants' learning outcomes as they constructed more meaningful and relevant knowledge and skills about educational leadership.

Participants' recommendations for enhancing the advancing educational leadership virtual professional development

Considering this was the first time for the AEL to be delivered virtually, we expected to receive numerous recommendations about improving the use of technology and ZOOM, but this was not the case. Most of the participants' recommendations to enhance the AEL VPD when presented again for other participants in the future were mainly related to time management/issues. Since the AEL was offered originally in three face-to-face intensive days, when it moved to a virtual format the same timeframe of 3 days did not change. While attending the AEL in a three face-to-face training format seemed appropriate for participants, they perceived the 3-days virtual training as hard for them. They explained that it was hard for them to spend almost 8 h for three consecutive days in front of their computer screens. Therefore, most of their recommendations to enhance the AEL VPD were focused on increasing the number of breaks in each day and expanding time for those breaks so that they could stretch and to reduce their virtual fatigue.

Based on the feedback obtained from the participants, the Breakout Rooms provided effective collaboration and interactions among participants beyond our expectations. The only recommendations participants shared related to the Breakout Rooms were to increase the time allocated for some activities in those rooms so that everyone could share their opinions. These recommendations were aligned with other recommendations related to considering a few more seconds for the transitions between the main room and the Breakout Rooms. In other words, as per participants, providing more time for activities in the Breakout Rooms and allowing a few seconds for participants to return from those rooms to the main rooms with everyone could be great additions to the AEL VPD.

The other important recommendations were related to sharing the AEL Agenda and materials prior to the AEL as well as providing participants with opportunities to rehearse on technology. We believe sharing AEL Agenda and rehearsing on technology could help participants feel more comfortable related to the flow of the AEL training. However, we do not think that sharing all AEL training materials would be helpful for participants. To elaborate on this, while sending some of the materials, especially the readings and instructions of some activities, prior to the AEL training might help participants to get prepared in advance, some of the activities specifically those designed to test leadership timely decision making such as rattlesnake are intended for participants to provide immediate responses to critical leadership situations. Thus, sharing them prior to the AEL VPD might provide participants with extra time to think about some of the decisions leaders may consider, which is not the goal of those activities. All in all, participants' recommendations about time are important to be taken into consideration for future AEL VPD.

Implications for practice

The COVID-19 pandemic was a factor that enforced educational leadership to promote emergency changes. The AEL training is a state and a university required training to all principal candidates who pursue a masters' degree in Educational Administration. The results showed high satisfaction with the virtual AEL training which provides all participants to participate in the AEL training activities. As explained earlier, the newly designed virtual activities were

virtual types of the face-to-face AEL training activities. However, the virtual activities seemed to have received higher engagement than the face-to-face. For example, dividing the participants into groups who join virtual breakout rooms, gives a valuable opportunity to introverted participants to voice up and share their professional experiences. In addition, the time allocations of the other activities including but not limited to Chat Box, jamboard, and presentations were more effective in the virtual platforms because in the face-to-face format the move from an activity to another (e.g., round table, lecturing, post it in, etc.) was time consuming. Much time is also consumed when the participants are changing their classroom settings. This time consumption is not an option in the virtual platform.

Since all virtual AEL training is recorded, the knowledge availability represents a major implication for practice. All AEL trainees who attended the virtual training, have access to the recordings of the 3-day training. This opportunity makes the knowledge gained from the training handy, and students can revisit the recordings whenever they want to refresh their knowledge about it. This ability to watch the training videos again was not an option in the face-to-face AEL training.

Implications for policy

Since the time of the study, TEA ruled that the virtual option for the AEL training may be retained as deemed appropriate by the providers; therefore, this study might be the first study published related to this AEL training policy. The results elicited several recommendations in regard to the AEL training delivery. We advocate for the virtual AEL new policy to continue in the future and to be a continued option along with the face-to-face version so that participants may select from between the two versions offered by state agencies or principal preparation program providers. We build this support to the policy consideration based on a number of reasons informed by the findings of the study. Those reasons are as follows.

Advancing educational leadership virtual professional development achieves equity

Based on what the participants shared, we found that they believed that the virtual AEL training saved their time and effort to commute from their homes and cities to go to the designated city in which a training is hosted. More importantly, this virtual AEL training waived the travel expenses. Since our program is fully online, we have students from the entire Texas. In the previous years when the participants were required to attend in person, they had to travel to Texas A&M University campus at College Station city, some students came from El Paso city which is over an 11-h drive away from College Station city.

The participants also have needed to secure and pay for lodging which may have increased the exposure to COVID-19. Thus, the virtual AEL training was the solution to reduce the risk of contracting the COVID-19 infection and to reduce the monetary expenses accompanied with attending the in-person training. This gave all students equal and equitable opportunities to attend the AEL VPD. Thus, with continuing potential for contracting COVID-19, we recommend the AEL training to be continued in the virtual delivery and for the reasons of equity and access, we support the state policy that allows for AEL VPD even after the risk of the COVID-19 pandemic ends.

The convenience of the advancing educational leadership virtual professional development

The participants also shared that the virtual training was convenient, because they have the advantage of attending the training from home while they are being taken care of, or they are taking care of their families. One of the participants was tested COVID positive, and she was under treatment, the AEL virtual delivery enabled her to participate while she was in bed. If the training were in its traditional face-to-face format, such participants would not have been able to participate. With school closures and some public school students quarantined during the time of the study due to COVID-19, participants were among those educators with an increased presence of children at home. This situation may have prevented participants from being able to attend the AEL training if they have to travel to the AEL training facility. Thus, when the training was available virtually, these participants were able to take care of their children while they were engaged in the training.

Because of the convenience for principal candidates to be able to collaborate and participate virtually from home, the policy consideration for AEL is that after this pandemic has subsided, that the AEL VPD continue as an option. The findings from this empirical study can provide policymakers at the state level with added information to support a policy decision for delivering AEL virtually as an option along with the face-to-face option for AEL. This policy consideration is important to advance equity and access for all participants given the fact that participants perceived the virtual AEL format to be effective for them. The advancement of online learning, as demonstrated with ZOOM and the technological tools noted in this study as an example, can help principal preparation faculty to engage, to meet the needs of adult learners in leadership training, and to equip them with leadership knowledge and skills, perhaps equally as well as a face-to-face AEL training.

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 Texas A&M University-College Station Institutional Review Board (IRB). The 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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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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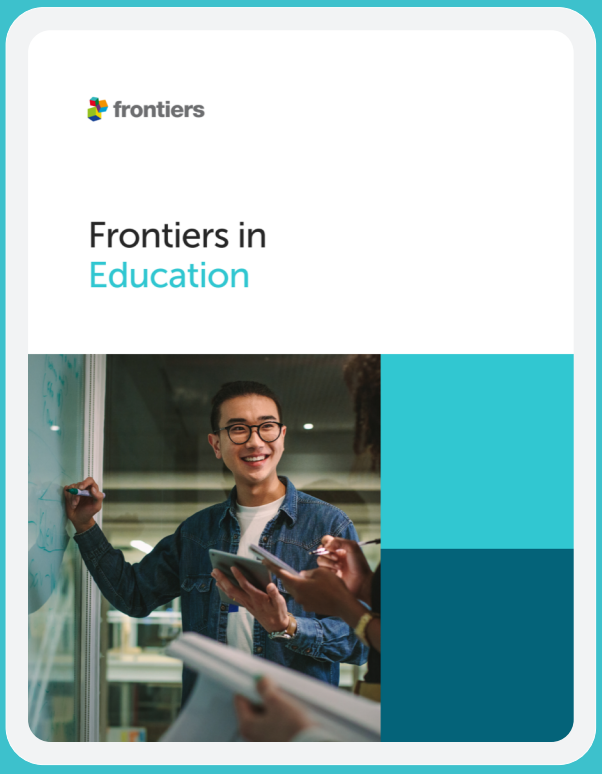

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