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Online cooperative learning: exploring perspectives of pre-service teachers after the pandemic

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ABSTRACT

Mainly, research has explored pre-service teachers' perspectives toward cooperative learning within face-to-face teaching. However, in a post-pandemic scenario, previous research has yet to effectively explore pre-service teachers' (PSTs) perspectives toward online cooperative learning (OCL) in teacher education programs. So, recognizing the gap in the literature, this paper aims to explore the perspectives of PSTs towards OCL. The researchers employed a qualitative research design for the present study. The researchers conducted semi-structured interviews with 10 PSTs who underwent OCL during the pandemic. These PSTs may possess digital proficiency, virtual collaboration abilities, flexibility in evolving educational environments, and an enhanced understanding of online cooperative learning methodologies within modern education. Researchers employed a thematic analysis to analyze the qualitative data obtained. The various themes that emerged from the study are perceived benefits of OCL, challenges to OCL, technological proficiency, learning strategies and support, and building a supportive online learning community. Future researchers may contribute to advancing effective online learning practices by gaining a deeper understanding of pre-service teachers' perspectives towards OCL through research on a larger scale, including various teacher education programs in various countries.

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1. INTRODUCTION

Due to the COVID-19 pandemic, educational institutions worldwide have quickly shifted to online learning, which has profoundly affected learning at all educational levels [1]–[3]. This unprecedented change has required educators to adopt new learning strategies and technology-mediated learning environments [4], [5]. Online cooperative learning has emerged as a valuable pedagogical method for encouraging student collaboration, interaction, and knowledge construction [3], [6]–[8]. Historically, pre-service teachers received teacher-centered, lecture-based courses that lacked online learning aids, such as learning management systems and video conference sessions [9]–[11]. The ongoing pandemic compelled higher education institutions to offer more online courses that could prioritize the requirements and preferences of students [10], [12]. Understanding pre-service teachers' perspectives towards online cooperative learning in a post-pandemic context is paramount as they prepare to enter classrooms as future educators. As the future of education, pre-service teachers play a crucial role in shaping the learning environment.

The COVID-19 pandemic has had a transformative impact on prospective teachers, equipping them with additional skills and a more comprehensive understanding of technology, online learning, and

educational adaptability. These experiences have a lasting impact on their work post-pandemic period. In addition, their perspectives towards online cooperative learning (OCL) could substantially impact the efficacy of this learner-centered strategy in post-pandemic contexts. Employing qualitative methods to investigate these perspectives allows a better understanding of pre-service teachers' challenges, benefits, and overall perceptions towards OCL.

2. LITERATURE REVIEW

Several research studies have validated the efficacy of cooperative learning. Research has shown that cooperative learning is effective in traditional and face-to-face educational settings [13]–[15]. The COVID-19 pandemic-induced shift to online learning has prompted research into the effectiveness of cooperative learning in digital environments [1], [2], [4]. Moreover, studies indicate that online cooperative learning can produce comparable results to traditional in-person cooperative learning [16]–[18]. Furthermore, this educational approach could positively impact scholastic performance, the development of critical thinking skills, and the ability to solve problems among students [5], [17], [19], [20].

Additionally, online cooperative education presents distinctive prospects for student involvement and cooperation [19], [21]–[23]. Implementing online cooperative learning has increased student engagement, motivation, and a sense of belonging, resulting in improved learning outcomes [14], [24], [25]. Students' engagement in collaborative activities could promote a feeling of responsibility toward their learning process, enhancing their self-efficacy and intrinsic motivation [7], [15], [22].

However, factors, including but not limited to disparities in technology accessibility, time zone differences, and cultural barriers, challenge the achievement of equal participation in online cooperative learning [26]–[28]. Proficiency in using digital technologies and platforms is a crucial skill that pre-service educators could possess to facilitate effective collaboration in an online environment [29], [30]. In addition, teachers could employ various strategies to encourage active participation in online cooperative learning to foster student engagement [14], [23]. Effective execution of strategies necessitates the provision of specific task directives, meticulous allocation of duties and responsibilities, structured communication channels, consistent feedback, and opportunities for self-reflection and metacognitive analysis [2], [23], [31]–[33].

Furthermore, the teacher assumes a pivotal role in online cooperative learning as a facilitator and guide [31], [34]–[36]. Effective communication and constructive feedback from the facilitator are crucial in online cooperative learning. Efficient communication between facilitator and students necessitates the utilization of direct and succinct communication channels, active listening, and constructive feedback [31], [37], and these approaches could facilitate comprehension, collaboration, and continuous improvement in learning [38]. Moreover, engaging in collaborative activities, receiving constructive feedback from peers, and participating in social interactions could facilitate the development of a shared sense of community and mutual assistance among the learners during online cooperative learning [39]–[41]. The presence of a robust community inside an educational setting has the potential to impact student engagement, motivation, and teamwork positively [24], [26], [38], [42], [43].

Furthermore, active engagement in dialogues, critical analysis of diverse perspectives, and collaborative problem-solving facilitate the development of sophisticated cognitive abilities among learners [29], [30], [44]. These could promote affective empathy and enhance their aptitude for critical thinking to tackle challenges [45], [46]. Cooperative learning activities help pre-service teachers acquire communication, collaboration, negotiation, and conflict resolution skills [31], [47]. These skills are crucial for their professional practices in the future.

Given the post-pandemic situation, the literature review underscores the pressing necessity for the proposed inquiry concerning pre-service teachers' perspectives toward online cooperative learning in light of the swift transition toward digital education. The present research addresses a gap in the existing body of literature by examining pre-service teachers' perspectives on cooperative learning in an online learning environment after the pandemic. The objective of the present study is to explore the perspectives of pre-service teachers towards OCL after the pandemic.

2.1. Theoretical framework

Three theories guided the present study [48]. Constructivism guides pre-service teachers by encouraging active learning and student collaboration. They design stimulating activities that encourage critical thinking and problem-solving, facilitating group projects and discussions for knowledge construction. Sociocultural theory emphasizes social interactions and collaboration, guiding pre-service teachers to prioritize peer engagement and cultural context in online cooperative learning [49]. Technological, pedagogical, and content knowledge (TPACK) framework guides pre-service teachers in integrating technology, pedagogy, and content knowledge for effective online collaboration during OCL [50].

3. METHOD

The researchers employed a qualitative exploratory research design for the present study, employing semi-structured interviews for data collection. After following the thematic analysis to analyze the data from the interviews, they adhered to the [51] model guidelines. The research conduct and ethics committee of Christ University authorized the study with approval number CU: RCEC/00208/05/2. The researchers conducted the study in the year 2022.

During the pandemic, some teacher education colleges used OCL, and the researchers consulted a few of them to understand their perspectives on OCL among pre-service teachers after the pandemic. The researchers used a snowball sampling technique; ten pre-service teachers volunteered to participate in in-depth interviews. Table 1 represents the demographic information of the interview participants. To maintain confidentiality, the researchers assigned pseudonyms P1, P2, P3..., and P10 for the participants and removed their identities from the data.

Initially, the researchers created an interview guide and sent it to a panel of experts in the field for content and face validation. They incorporated the panel's recommendations into the final version of the guide. They invited the participants for semi-structured interviews through Google Meet at their convenience. Before conducting the interviews, the researchers obtained informed consent from the participants. The co-author, who holds an M. Phil and Ph.D. degree, conducted interviews. In the interview, the researchers prompted participants to provide more information and redefined subsequent questions based on their responses. Each interview took 15-20 minutes, and the researchers recorded the interview verbatim. They securely stored the data in a password-protected file, which only the researchers could access.

The researchers employed triangulation to verify the validity and quality of the obtained data. To prevent selective perception and interpreter bias, the researchers independently analyzed the data and compared their findings during thematic analysis. While composing the central theme and sub-themes, the researchers triangulated it with previous studies. Similarly, the researcher triangulated and validated the themes and subthemes with the existing theoretical framework.

Table1. Demographic details of interview participants

Participant	Gender	Age
P1	Female	22
P2	Female	23
P3	Female	22
P4	Female	25
P5	Female	24
P6	Female	24
P7	Male	24
P8	Male	24
P9	Male	23
P10	Male	23

3.1. Data analysis

The researchers transcribed the interview recordings. They read and reread the interview transcripts multiple times to gain a meaningful understanding of the participants' perspectives and then began developing preliminary codes. Researchers revisited the preliminary codes multiple times to validate the final sub-codes. They condensed several distinct ideas expressed by the participants into themes and subthemes. Further condensing subthemes yielded distinct themes. The researchers combined transcripts with similar themes and reexamined the main theme and subthemes. Before finalizing any central theme or subthemes, the two researchers agreed and reviewed one another's opinions. This collaborative approach enhanced the validity and credibility of the findings by leveraging multiple perspectives and assuring robust theme development. Ultimately, the agreed-upon themes are refined, named, and incorporated into the analysis, contributing to a comprehensive and well-supported interpretation of the data. Table 2 represents the themes and sub-themes that emerged from the data analysis.

4. RESULTS

The present study explored the perspectives of pre-service teachers (PSTs) towards online cooperative learning after the pandemic. The researchers used thematic analysis for the analysis of interview data. Table 2 represents the organization of themes and subthemes that emerged from the thematic analysis.

Table 2. Themes and sub-themes

Themes	Sub-themes
Perceived benefits of OCL	Critical thinking and collaboration
	Motivation and ownership of learning
	Student engagement
Challenges to OCL	Equal participation
	Encouraging participation
	Reluctant to contribute
Technological proficiency	Support and training
	Positive learning experiences
Learning strategies and support	Role of facilitator
	Learning strategies
	Strategies for encouraging participation
Building a supportive online learning community	Benefits of analyzing different perspectives
	Enhancing collaborative and learning outcomes
	Communication and feedback importance
	Development of critical thinking skills

4.1. Theme 1: perceived benefits of OCL

This theme refers to pre-service teachers' perspectives on the benefits of online cooperative learning. During the interviews, participants highlighted many perceived positives of online cooperative learning, such as student engagement, active participation, promotion of collaboration, and critical thinking skills. These are in agreement with the observation of previous study [40]. The findings align with the theoretical framework [48], which guides PSTs in promoting active learning and collaboration among students to foster critical thinking, problem-solving, and knowledge creation within group settings.

4.1.1. Critical thinking and collaboration

Acquiring the skills in the context of OCL are of utmost importance for PSTs. These competencies empower PSTs to analyze educational concepts critically. It fosters collaboration with peers and develops innovative and captivating learning experiences for themselves and their students.

> P1: *I consider online cooperative learning a highly effective strategy for fostering student engagement and collaboration [….].*
> P4: *Initially, I had doubts about the effectiveness of online cooperative learning […]. However, I have witnessed the benefits after engaging in various collaborative activities [….].*
> P8: *Students participated more actively and expressed diverse perspectives [….]. It made me realize that this approach can potentially promote critical thinking and collaboration […].*

4.1.2. Motivation and ownership of learning

The skills enable PSTs to actively learn, assume responsibility for their learning, and dedicate themselves to lifelong professional development. The participants expressed that motivation and ownership of learning are essential for the success of cooperative learning in an online environment. These are consistent with the findings reported by previous research [22].

> P9: *It enables students to participate actively and contribute their unique perspectives […] in online collaborative assignments. I have witnessed students become motivated and assume responsibility for their learning […]*
> P6: *The dynamic nature of online cooperative learning has emphasized the significance of openness to new ideas and approaches […]. It has instilled an attitude of continuous improvement and learning as I adapt to my students' changing needs […]*

4.1.3. Student engagement

Involving and motivating students to create a compelling and dynamic learning environment constitutes student engagement. These competencies enable PSTs to design engaging and effective learning environments for their prospective students, whether online or in person. These findings are consistent with the findings of prior studies undertaken [7]. Participants 1 and 5 have faith in the effectiveness of online cooperative learning. They emphasized that it promotes student engagement, participation, and collaboration.

> P5: *Students were more willing to partake in online collaborative activities and share their ideas [….] It fostered a sense of ownership and enhanced the significance of learning […]*

P7: *My online cooperative learning experience has been eye-opening […] Initially, I had difficulty utilizing online platforms and resources effectively [….] to acquire the necessary digital skills to facilitate online collaboration required time and practice […]*

4.2. Theme 2: challenges to OCL

Because some students are more reticent or hesitant to contribute, the participants acknowledge the difficulty of ensuring equal participation among group members in online cooperative learning. Participants discuss instituting strategies such as alternating leadership roles and providing structured prompts to encourage active engagement and equal participation from all group members. This theme refers to the barriers they encountered. They identified challenges in regulating group dynamics and ensuring equitable student participation throughout OCL. These are in agreement with previous research [36].

4.2.1. Equal participation

Equal participation promotes belonging and active participation and prepares PSTs to create equitable and inclusive learning environments as teachers. It also helps to promote equal participation and help each other resolve technical issues during OCL. These align with the previous observations [28].

P5: *Managing group dynamics was a formidable obstacle […] We were responsible for ensuring that all members participated equally […].*
P9: *One of the challenges I encountered during online cooperative learning was to understand and resolve technical issues […]. We need to have a solid foundation in digital skills […]. Inadequacy in utilizing digital tools and platforms posed difficulties for me during OCL […].*

4.2.2. Encouraging participation

Encouraging participation in OCL prepares future educators to create a stimulating and inclusive learning environment. Participants felt that clear communication and assigning roles and responsibilities for participants are fundamental for the success of OCL. Previous studies [28], [44] align with the present findings.

P8: *We allotted distinct roles and responsibilities, and everyone participated […]. It required clear communication and the forthright setting of expectations […]*
P9: *It was a learning experience for me as a future teacher to establish a balanced and inclusive online collaborative environment […]*

4.2.3. Reluctant to contribute

Some group members are reluctant to actively participate and contribute their ideas, insights, and contributions during online cooperative learning. Participants felt that rotating leadership roles and a well-structured feedback system helped them to participate equally in OCL. Previous studies conducted in a similar context have shown agreement with these findings [39]. Participant 5 identifies a difficulty in ensuring that all group members participate equally. Participant 6 expressed that certain student are typically more reticent and unwilling to partake.

P6: *Some students are typically more reticent and unwilling to partake […]*
P10: *All group members are encouraged to participate by implementing strategies such as rotating leadership roles and providing structured prompts […]*

4.3. Theme 3: technological proficiency

Technological proficiency significantly influenced pre-service teachers' perspectives toward online cooperative learning. Participants discussed their comfort level with technology and ability to navigate online platforms effectively. Some expressed needing additional training and assistance to improve their technological abilities. Taghizadeh and Ejtehadi [20] reported similar observations in their studies. These elements align with the previous theoretical framework [50], which guides PSTs in the seamless integration of technology, pedagogy, and content knowledge to facilitate successful online collaboration through the use of OCL.

4.3.1. Support and training

Support and training are essential factors for the technological proficiency of PSTs during their participation in OCL. These refer to the assistance, resources, and guidance that help PSTs use technology for cooperative learning experiences. PSTs' technological proficiency during online learning depends on support and training. These are resources, aid, and direction to assist PSTs in utilizing technology for effective OCL. Previous study [47] reported similar observations in their studies.

P7: *It is essential to establish a supportive online learning community […]. We felt connected, and our teacher played a crucial role in establishing the environment to foster collaboration […]*
P5: *Yes, I initially encountered some technical issues. It took time to master the various online platforms and tools […]*
P4: *My confidence in utilizing various online platforms and resources has increased […]. Technology proficiency is essential for facilitating collaborative activities and ensuring students have a positive learning experience […]*
P3: *I became pretty relaxed […]. It made me realize the significance of using technology proficiently to facilitate collaboration […]*

4.3.2. Positive learning experiences

PSTs require technological expertise to participate effectively in OCL. So, it involves creating pertinent, productive, and engaging digital educational experiences—these aid PSTs in utilizing technology effectively for OCL. Previous research conducted in comparable contexts is consistent with these findings [12]. Participant 5 needed some help with the technological aspects of online cooperative learning. Participant 9 reported that, with assistance and training, they had gained the confidence to use the online tools.

P9: *Through practice and assistance from my peers and teacher, I could use various online tools, and I found online collaboration and peer interaction enjoyable […]*
P3: *Encouragement of active participation and respectful dialogue within groups promote a positive and inclusive learning environment [….]*

4.4. Theme 4: learning strategies and support

Participants shared their experiences with various learning strategies utilized in online cooperative learning under this theme. They discussed the significance of communication, instructions, and providing students with supplementary materials. They also highlighted the need for teachers to provide ongoing support and guidance through timely feedback and clarification of doubts. These are consistent with previous findings by Karo and Petsangsri [38].

4.4.1. Role of facilitator

It implies that teachers actively create a helpful and productive learning environment. PSTs learn the skills, methods, and attitudes needed for cooperation and technology proficiency during OCL. The facilitator's role in OCL is commendable, and Chan *et al.* [16] reported a comparable finding.

P8: *Important are clear instructions and guidance from teachers […] consistent feedback on our facilitation strategies enabled us to evolve […].*
P4: *Under the teacher's guidance, we established a welcoming online learning community where we felt valued and encouraged to participate […].*

4.4.2. Learning strategies

Developing an OCL experience that actively encourages PST skill development, engagement, and achievement provides a solid foundation for their future teaching careers. The participants emphasized that the learning materials provided through learning management systems (LMS) supported them to prepare well for their sessions. They also emphasized that the various cooperative learning strategies used during online learning increased their interaction and learning.

P9: *Providing students with support materials and resources also increased their engagement [….]*
P10: *The learning strategies, discussions in breakout rooms, presentations, scaffolding, feedback, and reflection helped us to achieve our learning goals [….]*

4.4.3. Strategies for encouraging participation

Strategies for encouraging participation are essential for establishing a vibrant and inclusive online learning community. The selection of appropriate strategies allows PSTs to acquire collaborative experience, develop essential skills, and prepare them for their future careers as teachers. Several researchers [24], [52] reported a similar observation. Participant 8 believes the teacher's function is crucial in online cooperative learning. Participant 10 emphasized the importance of learning strategies in nurturing a collaborative online learning environment.

P3: *Creating a supportive online learning community through icebreaker activities and promoting meaningful interactions helped us develop collaboration and a sense of belonging [….]*
P4: *Regular check-ins, individualized feedback, and a positive and inclusive virtual environment promoted a robust collaborative culture between us [….]*
P8: *designed to break the ice at the outset of the course, fostered a sense of community among students [….]*

4.5. Theme 5: building a supportive online learning community

This theme complements the preceding theme and emphasizes the significance of OCL in establishing a supportive online learning community. The interviews highlighted the significance of establishing a supportive online learning community. Participants discussed strategies, including icebreakers, regular check-ins, and promoting a positive and inclusive virtual environment. They emphasized the teacher's role in fostering a sense of community and promoting meaningful student interactions. These are in coherence with the theoretical framework [49], highlighting the significance of social connections and cooperation. It suggests that PSTs should emphasize peer involvement and cultural context in OCL.

4.5.1. Benefits of analyzing different perspectives

Actively analyzing the perspectives of others is necessary to create a positive online learning community. PSTs actively value and incorporate other ideas, expand their learning experiences, develop essential skills, and create a collaborative and inclusive online learning community. Previous research conducted on comparable grounds supports this finding [46].

P1: *As everyone in the group assumed the responsibility and expressed their opinions, my perspectives broadened, and I became more knowledgeable about the topic [….]. The group received individual feedback and a chance to convey their opinions [….]*
P8: *Helped me to respect everyone's viewpoints […]*

4.5.2. Enhancing collaborative and learning outcomes

Enhancing collaborative and learning outcomes improves their learning and prepares them for teaching by enabling PSTs to adapt, learn, and cooperate effectively. OCL helped them to learn in groups and work towards the active construction of knowledge. Previous research [45] is consistent with these findings.

P7: *Online cooperative learning enabled us to collaborate and gain knowledge from one another [….] It promoted my teamwork, communication, and problem-solving skills […]*
P3: *It taught us the importance of collaborating with others to attain our educational objective […]*

4.5.3. Communication and feedback importance

Effective communication and feedback mark an accommodating online community. These increased engagement and participation during OCL. Research by Alwafi *et al.* [24] made a comparable observation.

P5: *Throughout my participation in online cooperative learning, I recognized the significance of prompt feedback and effective communication […].*
P8: *Regular communication with group members ensured everyone was on the same page, and prompt facilitator feedback helped students enhance* their *collaborative abilities and learning outcomes [….].*

4.5.4. development of critical thinking skills

Critical thinking enhances OCL experiences and fosters an online support community for PSTs. These skills enable PSTs to engage in critical thinking, constructive interaction, and effective collaboration in digital learning. These are consistent with previous research [26]. Participant 3 observed that developing critical thinking abilities benefits online cooperative learning. Participant 8 recognized the importance of effective communication and timely feedback.

P1: *One of the benefits of online cooperative learning that I have observed is the development of critical thinking skills when we effectively articulate our thoughts while contemplating alternative perspectives through reflection […]*
P3: *We analyzed our viewpoints and evaluated diverse perspectives within our groups […] This strategy encouraged us to think critically and consider alternative peer perspectives […]*

5. DISCUSSION

The present study employed a qualitative framework and explored pre-service teachers' perspectives on online cooperative learning after the pandemic. Table 2 depicts the themes and subthemes that emerged from the interview analysis. Perceived benefits online cooperative learning emerged as one of the significant themes from the analysis. Subthemes include critical thinking and collaboration, motivation and ownership of learning, and student engagement. Pre-service teachers can critically assess educational concepts and collaborate well with others. Ownership of learning means taking charge of one's learning, actively engaging with course content, and seeking self-improvement. Active engagement skills created a pleasant and dynamic learning environment for OCL-participating PSTs, who motivated and engaged one other. Previous research showed that online tools and mentoring improve group functioning, individual motivation, and PSTs' willingness to participate in online learning and improve their critical thinking actively [14], [38], [40], [52].

Challenges to online cooperative learning emerged as a central theme. Subthemes include equal participation, encouraging participation, and reluctance to contribute. Participants initially needed help. By ensuring equal involvement in learning, student participation improved during OCL. All these would have enhanced learning experiences and ownership of learning. Some group members were reluctant to contribute during OCL activities with ideas, observations, or comments. The facilitator could handle this challenge by creating a supportive and inclusive workplace, participation norms, and active recognition and recognition contributions. Previous studies taking place in comparable contexts suggested that a growing number of educational institutions are in the process of shifting their courses to online platforms, a lack of active learning practices, scarcity of online resources, and improper training of teachers and students in online learning may be the problems [27], [28], [36], [53].

Technological proficiency emerged as a significant theme. Technological proficiency shaped pre-service teachers' views on online cooperative learning. Participants discussed their technology competence and internet navigation skills. Some students needed training in digital skills. The two subthemes that emerged under this theme are support and training and positive learning experiences. PSTs could learn to use digital technologies, interact with peers, and provide engaging online learning experiences with the proper assistance and training. PSTs must have positive OCL learning experiences to improve technological competence for online learning. To use technology for OCL effectively, PSTs must create engaging, constructive, and meaningful educational encounters in digital worlds. Previous studies on similar contexts showed that students' online learning experiences depend on their understanding of digital culture, communication, and information retrieval [12], [44], [47].

Participants discussed their experiences with online cooperative learning strategies, facilitators, and peer support during OCL. Direct contact, explicit instructions, and student supplementary materials were stressed. Teachers' continued support and guidance through timely feedback and expectation clarification were necessary during OCL. Subthemes from this theme include the role of facilitator, learning strategies, and strategies for encouraging participation. Teachers' involvement in OCL helps pre-service teachers develop their skills, methods, and attitudes needed for collaboration with technology. Choosing ideas and approaches to create an online learning environment supports PSTs' cooperation and learning in a digital environment. Accordingly, strategies for encouraging participation are essential to selecting learning strategies and pivotal to motivating and supporting PSTs' active participation in OCL. Previous studies on similar contexts revealed that instructional styles influence motivation, positive attitudes, and online learning misconceptions, according to previous studies [16], [23], [54]. Building a supportive online learning community emerged as the central theme.

Participants discussed the role of activities like icebreakers, regular check-ins, and promoting a sound and inclusive virtual environment. They stressed the teacher's responsibility to build a supportive community and meaningful student interactions. The subthemes under this are the benefits of analyzing different perspectives, enhancing collaborative and learning outcomes, communication and feedback importance, and development of critical thinking skills. Analyzing multiple perspectives shows the benefits of carefully considering and understanding the online learning community's thoughts. Active evaluation and assessment of the collaborative process and the outcomes of online instruction improve them, helping OCL build a healthy online community. Communication and feedback help PSTs build a supportive online learning community where they feel connected, inspired, and appreciated during OCL. Previous research has shown that collaboration and an active learning community improve motivation, attitude, learning, and knowledge construction [24], [26], [38], [42]. The strategy initially met with skepticism and resistance, but as participants gained experience, they reported adopting it progressively. Many acknowledged its potential to nurture inclusive and equitable learning environments, highlighting adaptability's importance in changing circumstances in the landscape of contemporary education.

6. CONCLUSION

This qualitative study investigated pre-service teachers' perspectives toward online cooperative learning in post-pandemic contexts. The findings highlighted the benefits, challenges, and alterations in attitude that pre-service teachers encountered while utilizing this learning strategy. The study shed light on the educational implications of online cooperative learning. It emphasized the need for professional development programs to enhance pre-service teachers' digital skills and competencies. In addition, the study also emphasized the importance of maintaining reliable backup systems and sufficient resources to enable the efficient functioning of online cooperative learning.

As the education landscape evolves, educators and policymakers might recognize the potential of online cooperative learning. By recognizing the perspectives and experiences of pre-service teachers, the education community could effectively support the successful implementation of online cooperative learning strategies, creating an inclusive and conducive learning environment for all students in the online classroom. Scholars can contribute to advancing effective online education practices by gaining a deeper understanding of pre-service teachers' attitudes toward online cooperative learning. As educational contexts change, this research will be crucial for determining the future of teacher education and online learning.

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