

Online Early Childhood Teacher Education Program: Practices and Future Possibilities

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Abstract

The study aimed to test the effectiveness and the feasibility of Zoom and Virtual Learning Environments (VLE) for early childhood teacher education (ECTE) at a university in Pakistan. The study addresses how a Community of Inquiry (COI) framework can be embedded within Zoom and VLE to make the online course meaningful, interactive and accessible. This is an exploratory case study with a mixed method approach. Data was gathered through survey, focus group discussion, reflective journals, observations and meeting notes. Pre- and post-online knowledge tests and assignments were used to assess changes in participant's knowledge and understanding. Survey result indicated positive attitude of participants toward using Zoom and VLE. The knowledge test scores improved at the end of the course. The study outlines insights into adapting creative and resilient online pedagogies for ECTE in emergency as well as normal circumstances. The paper will be of value to university faculty and policy makers, particularly in developing countries for designing teacher education programs.

1. Introduction

In light of the Covid-19 pandemic, the domain of higher education underwent a transformative transition towards virtual pedagogy and learning, encompassing diverse educational settings. The emergence of online education opened up new avenues for teaching and learning, and Zoom and VLE emerged as instrumental tools. This paper seeks to presents the dynamic landscape of ECTE where Zoom, a synchronous video conferencing platform, and VLE, a versatile online environment are harnessed to create enriched learning experiences and interactions.

Early childhood education plays a vital role in shaping the critical years of a child's life. During this stage of development, effective teaching not only promotes cognitive development but also lays the foundation for social and emotional well-being. Given the importance of the early years, educators should have a unique blend of pedagogical knowledge, technological know-how, and the

The emergence of online education has introduced innovative possibilities for ECTE allowing aspiring teachers accessing high-quality education regardless of geographical constraints.

Central to the discussion is the COI framework, a theoretical concept that acknowledges the interaction of cognitive presence, social presence, and teaching presence within an online learning environment. Within the realm of Early Childhood Education and Development (ECED), where holistic development, interactive engagement, and nurturing relationships are crucial, the COI framework provides opportunity to reshape the pedagogical landscape. It allows educators to work collaboratively to construct knowledge and foster social connections.

The study aims to provide a thorough view on the effectiveness and the feasibility of Zoom and VLE in an online teaching and learning program in real life-context. It addresses how a COI framework can be embedded within Zoom and VLE to make the online ECED course meaningful, interactive and accessible [3]. Over three months, Zoom and VLE were used with diverse group of participants distributed across Pakistan, United Arab Emirates, Canada, and United States to enhance their pedagogical content knowledge about ECED through synchronous and asynchronous methods.

The study was conducted at a private university in Pakistan, which offers professional development programmes such as graduate, masters, and doctorate program for teachers, educators, researchers and policy makers. It also offers continuous professional development and certificate courses across all levels and disciplines of education. This paper seeks to shed light on how a synergy between pedagogy, technology, and the COI framework can be created to shape the online learning experience for early childhood practitioners.

The social constructivist COI framework, developed by Garrison, Anderson, and Archer [7], has three interdependent elements cognitive presence, social presence, and teaching presence within virtual education environment. Applied within the context of online teacher education, this framework offers a conceptual guideline to establish and maintain social interaction,

cognitive engagement, and facilitative teaching strategies. COI's emphasis on social and collaborative approach to learning aligns seamlessly with the nature of early childhood education, where social interactions, relationships and engagement are pivotal for holistic development [2].

Online learning is a distinct mode of distance education. Zoom, a synchronous video conferencing platform, and VLE, comprehensive online platform, are prevalent in online education. The core of early childhood education is face-to-face interaction, which Zoom's video conferencing features emulate. It gives teachers the opportunity to participate in real-time conversations and engage in cooperative activities to simulate the social interactions that take place in face to face classroom settings [8]. Using methods like active inquiry, role-playing, and problem-solving, all essential to early childhood teaching, is made possible by this synchronous involvement [9]. VLEs offer a flexible framework for resource arrangement and sharing, encouraging asynchronous communication, and self-directed learning. In order to accommodate different learning preferences and developmental requirements, educators can construct interactive modules, discussion boards, and multimedia content on VLE [5, 12]. Early childhood educators must use individualized learning strategies to address the distinct learning trajectories of young learners, and the adaptability of VLEs is in line with these strategies.

The online ECTE experience is improved by integrating the COI framework into Zoom and VLE by fostering a sense of community, encouraging critical thinking, and building a robust learning ecosystem. Meaning making and critical thinking are fostered by the cognitive presence within COI [11]. In order to enable learners to co-construct knowledge, educators can facilitate group problem-solving sessions, reflective dialogues, and peer assessment using Zoom and VLE [13]. The ability of educators to establish real connections through Zoom and VLE enhances social presence inside COI [1]. With the aid of video conferencing, instructors can communicate nonverbal clues like emotions and facial expressions that are crucial for early childhood communication [10]. The asynchronous nature of VLEs enables learners to engage in discussions, share experiences and reflections, and create a virtual learning community [6]. By combining Zoom and VLE, the COI guiding principle of teaching presence is enhanced. A comprehensive learning experience can be created by educators by designing learning activities that complement the COI aspects [4].

Review of the literature clearly identifies the transformative potential of Zoom and VLE within the COI framework for ECTE. The combination of these components offers an innovative approach to preparing early years' practitioners who can use technology, foster meaningful relationships, and

design dynamic learning environments that resonate with the nature of early childhood education.

3. Design

Exploratory case study with a mixed method approach was used as it favors the collection of data in natural settings [14]. The qualitative data was collected through focus group discussion, analysis of reflective journals, observations and meeting notes. Whereas, quantitative data was gathered through pre- and post-online knowledge tests and assignments. The results of pre- and post-online knowledge tests was used to assess changes in participants' knowledge. Online survey using the Five-Likert scale was also administered to collect qualitative and quantitative data through google form. Feedback on survey questionnaire was collected from university faculty for validation. Survey tool was piloted and updated to enhance the effectiveness of the questionnaire. Mixed methods triangulation method was used to combine the quantitative and qualitative data for an in-depth analysis. The research questions were:

1. Do course participants' scores change from the pre-knowledge test to the post-knowledge test?
2. How COI framework contribute to enhance the effectiveness of the online teacher education program?
3. What are the participants' experiences of online teacher education program including supporting and hindering factors?

4. Course Detail

A 150-hours online course was spread over three months. The course content included brain development, nurturing care framework, assessment in early years, home-school partnership, setting up daycare and inclusive education.

5. Participants and Ethical Considerations

The population of this study was the CPD course participants who registered for online ECED course in a private university, Pakistan. The target population of this study consists of novice and experienced early years teachers, parents, caregivers and leaders from across the world with minimum 14 years of education. 51 course participants registered for the course out of which 14 were randomly selected for survey piloting, 25 participated in the focus group discussions (FGDs).

Participation in the study was voluntary, participants were initially given an electronic informed consent letter that indicated the goal of the study and that their specific responses would be kept anonymous and they were assured that they were allowed to withdraw from the study at any point.

6. Result

This section presents findings of the three main study questions. It analyzes the pre and post knowledge test, effectiveness of COI framework and participants' experiences of supporting and hindering factors in online learning.

6.1. Changes in participants' knowledge

Of the 51 participants who attended the online course, 47 completed the pre and post knowledge test, resulting in an overall ~ 92.1% completion rate. The post-test results reflect a clear and measurable increase in participants' knowledge acquisition and retention. The substantial increase of 10.95 mean score demonstrates the positive impact of the online course on the participants' knowledge. In the overall mean score of participants' pre-session knowledge test (60.03 \neq 12.85) and the post-session mean score (70.00 \neq 11.22), signifying an increase in participants' knowledge scores. It is important to mention that we used the free online tool Classmarker for the pre and post knowledge test.

Table 1. Change in participants' knowledge

Variable	Pre Test mean \neq SD	Post Test mean \neq SD
n=47	60.03 \neq 12.85	70.00 \neq 11.22

6.2. Effectiveness of COI Framework

The findings focus on COI framework on facilitating meaningful learning experiences through cognitive, social, and teaching presences, in online ECTE course through mixed method approach.

Social Presence

Affective expression: The data analysis reveals that a significant portion of participants found a sense of belonging and community within the online learning environment. Notably, 42.90% of respondents agreed and 40% strongly agreed with the statement, "Participants always felt acknowledged, welcomed, and part of a community on Zoom." Conversely, only 2.90% disagreed and another 2.90% strongly disagreed. Substantial majority of participants (45.70% strongly agreed and 42.90% agreed) reported feeling connected to their course facilitators on Zoom and the Virtual Learning Environment (VLE). In contrast, only 2.90% strongly disagreed and none disagreed.

Open communication: Participants felt comfortable communicating through the online

medium. The data indicates that 51.40% of respondents strongly agreed, and 34.30% agreed, showcasing a high level of comfort with online communication. In contrast, 2.90% disagreed, and 11.40% remained neutral.

Group cohesion: 51.40% of participants agreed, and 34.30% strongly agreed that large discussion on Zoom helped them develop a sense of collaboration. In contrast, 5.70% disagreed, and 8.60% remained neutral. This indicates a predominantly positive influence of large group discussions on fostering collaboration. Similarly, 51.40% agreed, 37.10% strongly agreed, 2.90% disagreed, and 8.60% remained neutral that small group discussion on Zoom helped participants develop a sense of collaboration. These findings reinforce that large and small group discussions significantly contribute to collaborative experiences.

Table 2. Social presence

Themes	Indicators	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Affective expression	I always felt acknowledged, welcomed, and part of a community on Zoom.	2.90 %	2.90 %	11.40 %	42.90 %	40 %
	I felt connected with my facilitators on Zoom and VLE	2.90 %	0 %	8.60 %	42.90 %	45.70 %
Open communication	I felt comfortable conversing through the online medium	0 %	2.90 %	11.40 %	34.30 %	51.40 %
	Large discussion on zoom helped me to develop a sense of collaboration	0 %	5.70 %	8.60 %	51.40 %	34.30 %
Group cohesion	Small discussion on zoom helped me to develop a sense of collaboration	0 %	2.90 %	8.60 %	51.40 %	37.10 %

The data derived from focus group discussions and reflections distinctly reveal that pedagogical techniques, such as the exchange of experiences within large and small groups, collaborative brainstorming, and deliberate use of probing and prompting queries in discussion forums, foster a sense of interconnectedness throughout the online course. Participants also found the atmosphere friendly and comfortable as can be seen from the following participant responses.

"There was a friendly atmosphere, I could express and ask without any hesitation. Many a times I used to be quite but the way you engaged me in the discussion was amazing." [FGD P7 Nov 5, 2022]

6.3. Cognitive Presence

This research examines triggering events, exploration, integration, and resolution in online learning to explain cognitive presence.

Triggering event: Participants' positive answers to "Course activities enhanced curiosity and critical thinking" reflect cognitive engagement. Most

(45.70%) agreed, and 40% strongly agreed and only 2.90% disagreed, while 11.40% were neutral.

Exploration: The data shows a favorable reaction to "The online course helped to explore various concepts of ECED." The majority (62.90%) and a strong majority (28.60%) agreed, only 2.90 percent disagreed, and 5.70 percent were neutral. This shows that Zoom and the VLE helped participants explore distinct ECED themes in the online course.

Integration: "Online course assignments helped me learn new knowledge and skills" received great replies. Over half (51.40%) agreed, and 42.90% strongly agreed, no one disagreed, and 5.70% were neutral. This shows that online course assignments were seen as excellent instruments for learning and integration.

Resolution: The data pertaining to the practical application of learning from the online course reveals intriguing insights. Specifically, participants were asked if they could apply the acquired knowledge and strategies in their practice. A significant percentage (54.30%) expressed strong agreement, while 34.30% agreed, none strongly disagreed, and only 11.40% remained neutral.

Participants' experiences reflect a strong engagement with course activities, a positive exploration of concepts, and a perceived integration of knowledge and skills. Moreover, participants felt capable of applying their learning in practical settings.

Table 3. Cognitive presence

Themes	Indicators	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Triggering event	Course activities enhanced my curiosity and critical thinking.	0.00 %	2.90 %	11.4 0%	45.7 0%	40%
	The online course helped me to explore various concepts of early child development	0%	2.90 %	5.70 %	62.9 0%	28.6 0%
Integration	Online course assignments helped me learn new knowledge and skills	0%	0%	5.70 %	51.4 0%	42.9 0%
	Online course enhanced my skills in using the following Zoom features.	0%	0%	6.00 %	50.0 0%	44.0 0%
Resolution	I can apply the knowledge and strategies learned in the online course into my practice	0%	0%	4.00 %	52.0 0%	44.0 0%

The data gathered from both focus group discussions indicated that incorporating interactive discussions and collaborative projects enhanced cognitive presence among participants. Participants' reflections demonstrated evidence of cognitive engagement, as they frequently analyzed and synthesized the course content, connecting theory to teaching.

"I think I have become more confident in teaching now. I know what methods to use with my students and know the theoretical reasons..." [Reflection Nov 20, 2022]

6.4. Teaching Presence

This analysis provides a comprehensive examination of teaching presence focusing on design and organization, facilitation, and direct instruction.

Design and organization: In response to clearly communication about course topics via Zoom and VLE, 51.40% agreed, and 40% strongly agreed, only a minor percentage (2.90%) disagreed, and 5.70% remained neutral. Similarly, communication about assignments and course details via Zoom and VLE 57.10% agreed, while 34.30% strongly agreed, no respondents who strongly disagreed, and only 2.90% disagreed. Furthermore, regarding the effectiveness of instructions, 42.90% strongly agreed, and 40% agreed. In contrast, 14.30% remained neutral, and 2.90% disagreed.

Facilitation: Regarding active engagement in large group discussions, a majority (51.40%) agreed, and 34.30% strongly agreed that the facilitators effectively engaged participants. Conversely, only 6% disagreed, and 8.60% remained neutral. In terms of content exploration within Zoom platform, 51.40% strongly agreed, and 42.90% agreed. A small percentage (2.90%) disagreed.

Direct Instruction: In response to the statement "I receive enough support from course facilitators during online classes," a significant percentage (60%) strongly agreed, and 37.10% agreed. None disagreed, and 2.90% remained neutral. Regarding critical thinking, the statement "The facilitators design the online course in a way that allows me to think critically about childhood education" garnered positive responses. Notably, 48.60% strongly agreed, and 40% agreed. Conversely, 3% disagreed, and 5.70% remained neutral.

Table 4. Teaching presence

Themes	Indicators	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Design & organization	Facilitators clearly communicated course topics via zoom and VLE	2.90 %	0.00 %	5.70 %	51.40 %	40%
	Facilitators clearly communicated details of assignments and schedules via zoom and VLE	0%	2.90 %	5.70 %	57.10 %	34.30 %
	Facilitators provided the clear instructions on Zoom and VLE.	0%	2.90 %	14.30 %	40%	42.90 %
Facilitation	Facilitators engaged the participants actively in large group discussion.	0.00 %	6%	8.60 %	51.40 %	34.30 %
	Facilitators used zoom platform effectively to explore content knowledge about ECED.	2.90 %	0%	2.90 %	51.40 %	42.90 %
Direct instruction	I receive enough support from course facilitators during online classes	0%	0%	2.90 %	37.10 %	60%
	Facilitators design the online course in a way that allow me to think critically about ECE	3%	2.90 %	5.70 %	40.00 %	48.60 %
	Facilitators design the online course in a way that allow me to learn in an appropriate pace.	0%	0%	0%	74.30 %	25.70 %

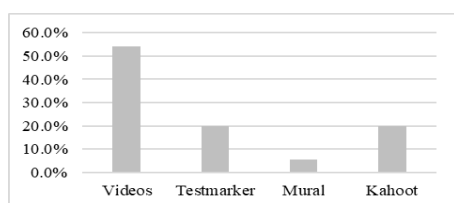
Qualitative findings reveal that participants had strong endorsement for online courses and facilitators' expertise in providing explicit instructions.

"I appreciate your guidance in preparing e-newsletter. It was my first experience and I did it well just because of your support." [Reflection Sep 13, 2022]

6.5. Supporting and Hindering Factors

Participants of the program reported that online course provided opportunity to use various digital tools within Zoom and VLE. Not only that they explored the digital tools, but they demonstrated great comfort in using these tools resulting in enhanced collaboration and creativity. Regarding the comfort level with digital tools, a significant percentage (54.30%) expressed comfort in using videos, while 20% and 20% were comfortable with "Classmarker" and "Mural," respectively. A smaller portion (5.70%) remained neutral.

Table 5. Participants comfort regarding digital tools



Analysis of reflections and FGD reveal that participants found that course assignments were designed around the use of various online tools, including Canva, PowerPoint, Video making and Publishers, and these were proven to be highly motivating.

"I like the assignments. They enhanced my digital skills..." [Reflection October 5, 2022]

Participants reported a few challenges in accessing to online course. Firstly, using digital tools via cell phones posed a challenge, especially for those participants who mainly accessed their classes through mobile, emphasizing the need for improved mobile compatibility and user-friendly interfaces to enhance the overall learning experience. Furthermore, accessing the class at a scheduled time proved to be challenging for some participants due to varying time zones, a participant shared,

"I have to wake up at 4:00 am to attend the class due to difference in the time zone." [FGD P12 September 28, 2022]

Moreover, screen sharing and using digital tools from mobile phones was another hindrance.

7. Discussion

One of the key findings of this study is the highly positive perception of the online course among program participants. These findings are consistent with previous research emphasizing the importance of designing effective online teacher education programs. The participants' favorable views affirm that online ECTE programs are not only feasible but also highly beneficial. The positive responses underscore the importance of adaptability and accessibility of online teacher education, particularly in accommodating the diverse needs of learners and demand of the digital world.

The COI framework was found to be an effective tool in designing and facilitating our virtual classrooms for adult learning. It encouraged self-directed learning, critical thinking, collaborative learning, and a sense of community within the online setting. The data collected suggest that the careful integration of COI principles within online platform encouraged participants to engage into deeper learning and feel confident in applying the new knowledge and skills to their practices. However, tailoring the use of digital tools to the specific needs and goals of the learning environment is crucial.

The implementation of the COI framework extends beyond the scope of our online teacher education program. In the context of ECED, the ECD practitioners can adapt the COI framework to create enriching environments that not only foster academic readiness but also nurture the social and emotional well-being of young children. For nurturing cognitive presence, practitioners can design activities that encourage critical thinking, problem-solving, and exploration. Social presence can be promoted through meaningful interactions that foster emotional connections and collaborative play among children. For harnessing teaching presence, practitioners can create a nurturing and responsive learning environment that aligns with the developmental needs of young learners. These findings contribute to the evolving body of literature on the adaptability of COI to various educational contexts emphasizing its versatility and potential influence on a variety of learner groups.

8. Implications and Future Directions

The findings suggest that well-designed online teacher education programs can effectively address the demands of aspiring educators, while providing flexibility and accessibility without compromising the quality of education. Future research must continue to focus on the long-term effects of online teacher education on instructional strategies and student outcomes.

9. Conclusion

Our world has rapidly changed with the pandemic. In this dynamic, ever shifting educational landscape, we are realizing the necessities of the skills like critical thinking, problem solving, effective communication, creativity and empathy are important skills to elevate teacher education. This paper embarked on a journey to investigate how the blend of COI framework, Zoom, and VLE could be used as an innovative strategy to improve online teacher education program in the digital era. The journey through research suggest that innovative and comprehensive online learning can be offered to early years' practitioner who are not able to come to the university location for whatever reason, offering higher education institutions the possibilities to offer a menu of course delivery modes including online.

This study revealed that by integrating Zoom and a VLE into the COI framework, educators can design and implement online teacher education program that foster social interaction, cognitive development, and learner centered pedagogies. The synchronous features of Zoom allow face-to-face interactions, overcoming distance and geographical boundaries and building connections. VLEs, on the other hand, provide dynamic repositories for resource curation, encouraging asynchronous interactions, and encouraging self-directed learning.

The study reveals that Zoom and VLE must be aligned with the COI framework to create holistic learning experiences. The findings also suggest that online ECETE program can be effective, if online teaching complements innovative instructional and technological pedagogies. The educators who intend to implement online teacher education for early years' practitioners should carefully design the course content, instruction, and assessment focusing on the principles of early childhood education.

Keeping in mind the promising outcomes of the online teacher education program and the evolution of the educational ecosystem, we recommend teachers and educators to be equipped with technological skills to continue learning in a digital era. Further, we suggest frequent offerings of online teacher education programs to provide educators with timely opportunities to update their skills, stay informed with the latest research and best practices.

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