# ICT-based pre-service training in post-pandemic India*

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**Abstract**

The Pandemic situation revealed that online teaching efficacy levels of pre-service teachers needed special attention through ICT-based training programs that cater to the real classroom needs of learners. The previous research focused on designing frameworks for the successful implementation of online teaching and learning in the light of the post-pandemic. The present research focuses on setting objectives for an ICT-based course for pre-service teachers in the Indian context by reviewing the while and post-pandemic research. The themes that were given prominence in the content search process were challenges and solutions related to ICT-based training of pre-service teachers. With this, an attempt was made to set objectives for an ICT-based course for pre-service teachers in India. The study has implications for teacher education, online learning, and online pedagogy.

**Keywords:** Online learning, blended learning, pre-service teacher education, COVID-19 pandemic.

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# INTRODUCTION

The blended mode of learning (which includes both face-to-face and online) that prevailed in teacher education before the pandemic depended on certain factors such as the availability of infrastructure, demands of the course taught, and learner needs in different countries. With the upsurge of the COVID pandemic, almost all the countries around the world have experienced a shift from face-to-face learning to remote learning (online mode). With this new intervention, teacher education in many countries may look forward to implementing blended models as well. The study of Deshpande and Shesh (2021) also revealed the same viewpoint. They presented the travails of rural teachers in India regarding the use of ICT: lack of ICT training, poor internet connectivity, and low English language proficiency of teachers. Yeop and colleagues (2016) provided an account of the activities in a blended mode, adapted from Bath and Bourke (2010). He categorized those activities into various categories such as learner resources, collaboration, learning process, communication, learner activity, and assessment. Şentürk (2021) provided an image regarding the differences between online and face-to-face learning/teaching which was adapted from Bath and Bourke (2010). He explained the differences under six categories: mode of teaching, student collaboration, learner resources, individualized learner activities, student-learner interaction, assessment, and evaluation.

Moorhouse and Wong (2021) prepared a blended (synchronous and asynchronous) instructional model after conducting an online survey with English language teachers of elementary and secondary schools level Hong Kong (N=73), and interviews with 10 of them. Their model contains an instructional approach, assessment, and communication among teachers and students. Başal and Eryılmaz (2021) mentioned the use of web 2.0 tools (Tricider, Flipgrid, padlet, Google Docs) with online classes will improve participation and reduce the negative notions of pre-service teacher participants about learning. However, the process showed less impact on pre-service teachers' confidence levels. Though the blended approach became a prerequisite for the 21st-century classroom there are some challenges. The research studies that focused on the challenges with the online component of blended learning are given below.

## Challenges with ICT-based training

Milad (2019) listed some challenges that instructors and learners may face with online learning. The challenges for instructors include technological awareness, content creation, communicating with learners through different channels (spoken and written), and ensuring the active participation of every learner. The challenges for learners include low motivation levels, a new learning environment, isolation, low internet connectivity, and low digital skills.

Rasheed and colleagues (2020) presented the challenges with the online component of blended teaching and learning after reviewing several articles.

**Table 1.** Student and Teacher Challenges

| Student Challenges (Main Categories) | Teacher Challenges (Main Categories) |
|---|---|
| • Self-regulation<br>• Technological Literacy and Competency Challenges (TLCC)<br>• Students' Isolation Challenges<br>• Technological Sufficiency Challenges (TSC)<br>• Technological Complexity Challenges (TCC) | • Teachers Technological Literacy and Competency Challenges (TTLCC)<br>• Online Video Challenges (OVC)<br>• Technological Operational Challenges (TOC)<br>• Teachers Belief Challenges (TBC) |

**Source:** Rasheed et al., 2020

The synthesis of these findings reveals that while the transition to online learning has presented numerous challenges, especially in resource-limited settings, it also offers opportunities to enhance engagement and collaboration through both synchronous and asynchronous methods. Effective teacher education now requires addressing the technological and pedagogical gaps, ensuring robust ICT infrastructure, and providing comprehensive training to leverage the potential of blended learning models. Integrating these insights can inform the development of more resilient and adaptable teacher education programs that can withstand future disruptions.

Research Gap: This study aims to bridge the gap in understanding the challenges and solutions associated with pre-service teacher training in ICT, focusing on the contrasting experiences and adaptations from while-pandemic to post-pandemic times.

The objectives of the research are

➢ To investigate the evolving challenges and solutions in pre-service teacher training particularly in the context of ICT integration from while-pandemic to post-pandemic periods and prepare objectives for an ICT-based course for pre-service teachers in India. The research question that guided the literature review is

1. What can be the objectives of an ICT-based course for pre-service teachers in post-pandemic India?

## METHOD

The authors selected studies that specifically focused on the challenges and solutions associated with the online component of blended learning, recognizing the shift to online education due to the COVID-19 pandemic and the necessity for a 21st-century classroom approach. The selection process involved:

➢ Identifying recent and relevant research published within the last five years.
➢ Ensuring diversity in geographical contexts to capture a range of experiences and challenges.

Once the studies were selected, the authors undertook a systematic analysis to extract key findings. This process involved:

Categorizing Challenges: Grouping the challenges and solutions into main categories based on similarities and recurring themes across different studies.

Contextual Interpretation: Understanding how these challenges manifest in different educational settings and technological contexts.

By synthesizing these findings, the authors gain a holistic view of the issues in blended learning environments. The recognition of these challenges informs their understanding and contributes to recommendations for improving the implementation of blended learning.

### Relevant Literature

In recent years, the integration of Information and Communication Technology (ICT) in teacher education programs has become increasingly important to meet the evolving demands of the education sector. While ICT offers numerous benefits in enhancing teaching and learning experiences, its implementation is not without challenges, particularly in diverse contexts such as India and other countries. This discussion delves into the challenges and solutions associated with ICT-based training for pre-service teachers, both within India and in international contexts. It highlights the unique hurdles faced in each setting and explores the strategies proposed to overcome these obstacles. Additionally, it underscores the critical role of ICT in modernizing teacher education and improving educational outcomes, especially in the wake of the COVID-19 pandemic. By examining the findings and solutions presented in studies conducted within and outside India, this discussion aims to provide insights into the complexities of ICT integration in teacher education and offer recommendations for addressing these challenges effectively. Through a comprehensive understanding of the issues at hand and the proposed solutions, stakeholders can better navigate the terrain of ICT-enabled teacher training to foster innovation, collaboration, and excellence in education. The challenges with IC-based training in the Indian context are given below:

Implementing ICT for pre-service teachers faces challenges such as limited access due to financial constraints, discomfort among those with limited ICT experience, fear of using new technology, technical disruptions, decreased self-sufficiency, potential loss of originality in projects, and negative impacts on physical health. Overcoming these hurdles necessitates tailored support and training for the effective integration of ICT into teacher education programs (Kumari & Naaz, 2021).

Anal and Naraginti (2022) mentioned in their findings significant challenges faced by student teachers in accessing and utilizing ICT resources. These challenges include inadequate physical infrastructure, insufficient academic facilities, and a lack of necessary ICT skills. The study emphasizes the importance of addressing these issues promptly to ensure the effective integration of ICT in the teaching and learning process. It calls for higher

authorities to thoroughly assess and improve ICT provisions to enhance productivity and development in education. Proper use and integration of ICT are seen as crucial for keeping up with technological advancements and improving educational outcomes.

Overcoming the challenges of implementing ICT in teacher education involves addressing a variety of issues such as bridging the digital divide, building infrastructure, enhancing teacher readiness, integrating ICT into the curriculum, and tackling resistance to change. Other significant challenges include ensuring the quality of online resources, designing effective assessments, shifting pedagogical approaches, teaching digital citizenship, providing technical support, staying current with technological advancements, assessing impact, ensuring accessibility and inclusivity, and safeguarding data privacy. Comprehensive planning is essential to tackle these hurdles, requiring professional development, infrastructure investment, curriculum redesign, and ongoing assessment. Despite these difficulties, integrating ICT can significantly improve educators' skills and benefit student learning (Pathak et al., 2023).

Having understood the challenges, it is important to consider the solutions offered to tackle the challenges by taking into account the required digital competencies of pre-service teachers. This will help in providing objectives for an ICT-based course in the Indian context to train pre-service teachers. The present research tries to attend to this gap through a review of studies on themes such as solutions to improve ICT-based training with a focus on digital competencies of pre-service teachers.

Ogbonnaya et al., (2020) surveyed 147 pre-service teachers, in Ghana and found that the online mode of learning was considered positively by pre-service teachers despite some technical and personal challenges. Similar research conducted by Dorsah (2021) with 115 pre-service teachers, in Ghana revealed that though trainee teachers' motivation levels are high for online learning and improved their self-autonomy, their confidence levels were low concerning communication on technological platforms. Adding to this the digital divide faced by teacher education institutions in South Africa was presented by Mavuru et al., (2022). For a successful ICT-enabled teacher education program, integration of ICT applications with content, methodology, and pedagogy is crucial. This requires a well-designed curriculum with mechanisms for quality assessment equipping institutions with ICT resources and providing educator training. Ensuring cost-effective technology access, continuous professional development, and collaboration between stakeholders are key. Additional strategies include updating ICT methods, providing well-equipped ICT labs, designing a globally competitive curriculum, and developing quality content. Ultimately, leadership from institutions and collaboration at various levels are vital for creating culturally responsive digital content (Sharma, 2022).

During the COVID-19 pandemic, teacher educators viewed technology-enabled learning (TEL) as crucial for maintaining uninterrupted teaching and learning processes. However, the post-pandemic perception also underscored the need for a blended approach to teacher education, combining face-to-face, online, and self-learning methods to address issues of equity, enhance teaching-learning experiences, and foster professional growth (Adhya & Panda, 2022).

Sarangapani et al., (2021) stated that the curriculum should focus on developing pedagogical content knowledge and a critical understanding of social contexts and educational goals. It is necessary to provide teachers with meaningful ICT training that encompasses the ability to adapt and integrate technology to enhance active learning goals. This training should go beyond just skills and knowledge, incorporating beliefs about the importance of ICT in education. Given the widespread use of ICT in education, especially due to the COVID-19 pandemic, all teachers must receive professional training in ICT to effectively support and promote active learning.

Nasri and colleagues (2020) found in their analysis that teacher education programs in Malaysia have recognized and implemented technology for learning and teaching as a response to unforeseen situations like Covid-19. The authors mentioned the basic areas such as technological platforms, material preparation, and assessment in which the teacher educators were given inputs and training. At the same time, pre-service teachers were introduced to accessing online material, viewing assignment procedures, and receiving instructions and details from teachers through social media. It is observed that participation in collaborative activities is less when compared to offline classes. Even the online assessment procedures were found to be new and insufficient. Regarding teaching practicum, student teachers' awareness of online methods of teaching needed improvement. Finally, the authors

suggested that teacher education courses should take inspiration from the technological pedagogical content knowledge (TPACK) model to face the challenges of online teaching and learning.

Scull and colleagues (2020) stated that the online learning environment requires special attention to not only technical aspects but also non-technical aspects such as logical thinking, interaction, and engagement. The authors proposed a framework that is 'access, participation, engagement' which considers aspects such as providing opportunities for learners to interact, explaining ways to communicate on collaborative platforms, setting clear objectives, and helping learners to reach their learning goals.

Donitsa-Schmidt and Ramot (2020) provided an account of the measures to be taken by the teachers at Kibbutzim College of Education (KCE), Israel to face the pandemic situation. The authors mentioned how there was an increased demand for knowing about learners' concerns. There was also a mention about innovative assessment techniques such as the use of podcasts, blogs, digital posters, portfolios, mind maps, and online presentations as part of the assessment. In addition to that, details related to pre-service teachers' making videos, preparing quizzes, building escape rooms, preparing lessons for asynchronous mode, and getting involved in peer teaching (as part of their teaching practicum) were also presented. The teacher trainees' performances were evaluated by their instructors and peers.

Kidd and Murray (2020) provided an account of the measures taken in ITE (Initial Teacher Education) programs during COVID-19 which helped in substituting the offline teaching practicum. Those measures included- making the interactions more meaningful (individual, group), setting goals for interactions, the role of scaffolding in the learning process monitoring collaborative goals through Flipgrid application, and bringing together the individual learner, instructor, peers, and stakeholders. It is suggested through the study that the teaching practicum needs to be guided by the teaching values.

Kim (2020) created a three-phased pre-service teaching practicum- 1) planning, 2) implementing, and 3) reflecting. The planning phase will include the description of the tools to the student teacher; the implementing phase includes lesson delivery to a small group (four) of learners which is observed by peers; and the reflecting phase includes reflection by both teacher and learner.

Post-pandemic research has highlighted the importance of pre-service teacher training in ICT. Pre-service teachers require training in critical thinking and digital skills to meet the 21st-century needs of learners (Hughes et al., 2023). Rahimi and Mosalli (2024) suggested that apart from the basic digital competence of pre-service teachers, there is a need for need-based and advanced ICT-based training. Facey-Shaw and Pitter (2023) advocated that practical exposure to ICT-based teaching will be more effective in the case of pre-service teachers. (Mphuthi and Tshelane, 2023) suggested that pre-service teacher education should focus on inquiry-based learning, planning, and innovative use of ICT to enhance teachers' competencies for professional development. Overall, online educational technologies are considered essential for teaching and learning, and further research is needed to understand their impact on pre-service teacher education, especially in their first year of enrollment.

## RESULTS

Based on the relevant literature provided, it's evident that integrating ICT into teacher education programs, particularly in the Indian context, presents several challenges such as limited access, insufficient infrastructure, and a lack of necessary ICT skills among pre-service teachers. However, various solutions have been proposed to tackle these challenges, both within and outside India. In Malaysia, for example, Nasri and colleagues (2020) highlighted the importance of incorporating technology into teacher education programs, especially in response to unforeseen situations like the COVID-19 pandemic. They emphasized the need for training in technological platforms, material preparation, and assessment, while also acknowledging the challenges in online collaboration and assessment procedures. Similarly, studies from Israel, Ghana, and South Africa have outlined measures taken to address the challenges of online teaching and learning, ranging from innovative assessment techniques to structured pre-service teaching practicums. These initiatives aim to enhance pre-service teachers' digital competencies and ensure effective integration of ICT into teacher education programs.

Moreover, post-pandemic perspectives emphasize the importance of a blended approach to teacher education, combining face-to-face, online, and self-learning methods to address issues of equity and foster professional growth. Additionally, there's a consensus on the need for meaningful ICT training that goes beyond technical skills to include pedagogical content knowledge and critical understanding of social contexts.
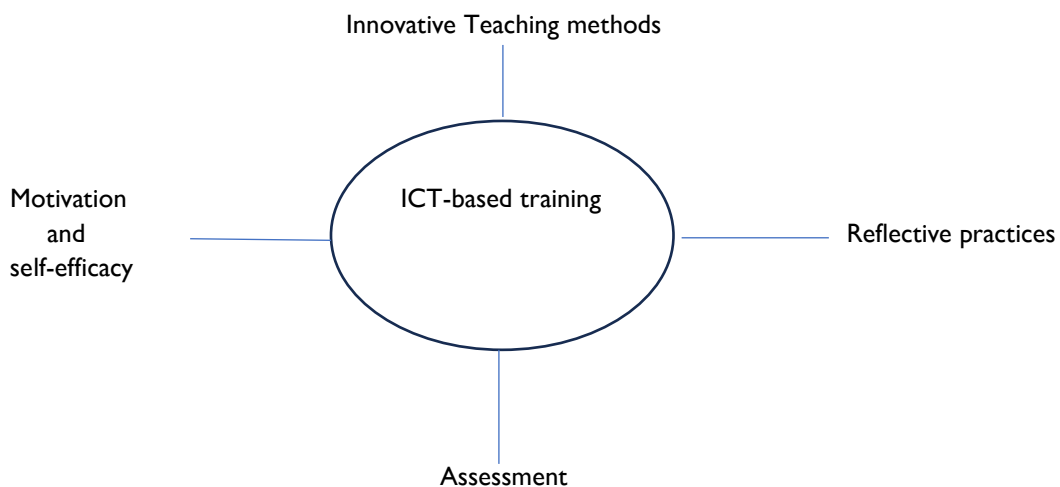


**Figure 1.** *Aspects of ICT-based training*

The findings form the above studies can be summed up as follows:

1. The key aspects of online training need to consider mode of teaching, collaborative Interaction among learners, planning learners' activities, and assessment of the activities **(**Bath & Bourke, 2010; Yeop et al., 2016; Scull et al., 2020; Şentürk 2021; Moorhouse & Wong, 2021).

2. It is important to consider pre-service teachers' motivation and self-efficacy levels with regard to the activities they need to get involved in such as collaboration, Interaction and communication on online platforms as part of the training (Ranjan, 2020; Sahoo, 2020;Dorsah, 2021).

3. In order to make the online mode of training successful it is essential to identify the hindrances and solve them (Milad 2019; Rasheed et al., 2020; Ogbonnaya et al., 2020) .

4. Innovative practices should be part of the online training especially in low technology countries in order to face the digital divide (Donitsa-Schmidt and Ramot, 2020).

5. It is indeed evident from the practices adopted by technologically advanced countries that reflective practices will help pre-service teachers whether in online or blended mode of training (Kidd and Murray,2020; Kim,2020).

## DISCUSSION

Considering the evolving landscape of education, particularly in the wake of the COVID-19 pandemic, the integration of Information and Communication Technology (ICT) into teacher education programs has become imperative. This discussion focuses on synthesizing findings from existing literature to establish learning objectives for ICT training tailored to pre-service teachers in India. By examining studies both within and outside India, this discussion aims to formulate a comprehensive framework that addresses the challenges and requirements specific to the Indian context. These learning objectives are crucial for equipping pre-service teachers with the necessary digital competencies to navigate the complexities of modern educational practices effectively.

**ICT Training for Pre-service Teachers in India**
The following are the learning objectives of training pre-service teachers in ICT (Information and Communication Technology) as per the NCERT B. Ed syllabus (2016).
Learning objectives of understanding ICT and its application (NCERT B. Ed syllabus, 2016):
  ➢ Appreciate the historical development of various educational media
  ➢ Demonstrate understanding of the main components of the computer hardware in use

- Use various digital technologies (hardware and software) for creating resources and providing learning experiences for all types of learners (including differently-abled)
- Use various ICTs for project based/problem-based constructivist learning environment
- Explain the role of ICT in authentic and alternative assessment
- Understand the social, economic, and ethical issues associated with the use of ICT

The learning objectives mentioned in the CBSE curriculum is more critical in nature and included assessment aspect as well. Seth (2018) found through their study that pre-service teachers require more exposure to online learning and TPACK frameworks which will help them to be understand the changes in learning environment and adapt accordingly. Moudgalya (2020) mentioned various initiatives which have been taken up by the Indian government in introducing ICT at tertiary level of education. The first step was laid by starting NPTEL (National Programme on Technology Enhanced Learning) later named as SWAYAM (Study Webs of Active–Learning for Young Aspiring Minds), which also offers teacher training courses.

Sahoo (2020) conducted an online survey with 318 pre-service teachers from different institutes in India. The author found that pre-service teachers require digital skills even though they are comfortable with online learning. Student teachers had less scope for interaction, they suffered poor internet connectivity and stressful conditions. Ranjan (2020) presented the results of study conducted with B.Ed students of Patna women's college, India. The study which was conducted for two year aimed at finding out the impact of face-to-face, online and blended modes on student motivation and also outcomes. The results favoured blended mode of learning. The author suggested that blended learning mode along with appropriate strategies can be implemented with pre-service teachers. The status of pre-service teacher education programmes during covid-19 in India has yet to be explored in order to strengthen the online teaching and learning processes of student teachers.

Allen et al., (2020) analysed that institutions which have already adopted a blended mode of course delivery faced the unforeseen situations like Covid-19 effectively in comparison to the institutions which have adopted traditional modes of content delivery. Carrillo and Flores (2020) reviewed articles related to teacher education during Covid-19 using CoI framework (social presence, teaching presence, and cognitive presence) and gathered some relevant issues relevant to online teaching and learning. Though teaching and learning through technological platforms during covid-19 come under 'remote' teaching and learning, it has got some important implications for 'online teaching and learning' (Ellis et al., 2020). König and colleagues (2020) stated that there is a need to prepare pre-service teachers for the future digitalized school systems. He further added that, confidence levels of teachers play an important role in adapting themselves to the technological pedagogical (TP) challenges.

Based on the findings from the review analysis conducted, the following objectives need to be included for an ICT-based course for pre-service teachers:
1. Planning Activities which Encourage Collaborative Interaction among Learners: The review found that participation in collaborative activities is often less in online settings compared to offline classes (Mohamad Nasri et al., 2020). Emphasizing collaborative interactions addresses this gap and is crucial for fostering engagement and deeper learning among pre-service teachers.
2. Finding Approaches and Methods Appropriate for Online Settings to Improve Learner Outcomes: Various studies emphasized the need for appropriate methodologies and frameworks for online teaching, such as the 'access, participation, engagement' framework proposed by Scull et al. (2020) and the TPACK model suggested by Mohamad Nasri et al. (2020). This objective focuses on identifying and implementing such effective approaches.
3. Considering the Motivation and Self-Efficacy Levels of Teachers and Learners Related to the Use of ICT Tools: Research in Ghana (Ogbonnaya et al., 2020; Dorsah, 2021) highlighted that while motivation for online learning was high, confidence in using ICT tools was low. Addressing motivation and self-efficacy is essential for ensuring that both teachers and learners can effectively engage with and utilize ICT tools.
4. Understanding the Technical Issues that May Arise in Teaching and Learning Processes and Adopting Innovative Approaches: Technical challenges and the digital divide were significant concerns in several studies (Mavuru et al., 2022; South Africa). Recognizing and innovatively addressing these technical issues are crucial for the smooth implementation of ICT in education.

These objectives are well-founded in the review analysis and provide a comprehensive framework for developing an ICT-based course for pre-service teachers. They address the key areas of collaboration, methodology, motivation, self-efficacy, and technical challenges, which are critical for the successful integration of ICT into teacher education.

# CONCLUSION

Teaching and learning during COVID-19 exposed the digital divide, lack of technological skills among pre-service teachers, lack of clear emphasis on online teaching needs of pre-service teachers (as part of teaching practicum in the curriculum), less scope for online collaboration and interaction, limited scope for the professional development of pre-service teachers. Reflecting on such practical experiences is indeed important. Dhawan, (2020) advocated that online learning needs to become more participatory with a focus on each learner. Indeed the crisis has revealed the challenges and it is time to search for solutions and strategies (Ahmed et al., 2021) to improve teacher education (pre-and in-service). To prepare effective ICT training modules or courses for pre-service teachers there should be a proper focus on both technical aspects such as the selection of online platforms, and digital platforms, considering technical challenges and also non-technical aspects such as motivation and self-efficacy levels of pre-service teachers related to collaboration, communication, interaction, and reflection.

## Statement of Researchers

## REFERENCES

Adhya, D., & Panda, S. (2022). Teacher educators' attitude towards technology-enabled learning and its incorporation into teaching-learning during and post-pandemic. *Educational Media International, 59*(2), 131–149. https://doi.org/10.1080/09523987.2022.2101204

Ahmed, S., Taqi, H. M. M., Farabi, Y. I., Sarker, M., Ali, S. M., & Sankaranarayanan, B. (2021). Evaluation of Flexible Strategies to Manage the COVID-19 Pandemic in the Education Sector. *Global Journal of Flexible Systems Management*, 1–25. https://doi.org/10.1007/s40171-021-00267-9

Allen, J., Rowan, L., & Singh, P. (2020). *Teaching and teacher education in the time of COVID-19*. Taylor & Francis. https://doi.org/10.1080/1359866X.2020.1752051

Anal, R. L., & Naraginti, A. R. (2022). Status and Problems of ICT in Teacher Education Programme in Manipur. *Available at SSRN 4064852*.

https://doi.org/10.1080/1359866X.2020.1752051

Başal, A., & Eryılmaz, A. (2021). Engagement and affection of pre-service teachers in online learning in the context of COVID 19: engagement-based instruction with web 2.0 technologies vs direct transmission instruction. *Journal of Education for Teaching*, *47*(1), 131–133. https://doi.org/10.1080/02607476.2020.1841555

Bower, M., Cavanagh, M., Moloney, R., & Dao, M. (2011). Developing communication competence using an online Video Reflection system: pre-service teachers' experiences. *Asia-Pacific Journal of Teacher Education*, *39*(4), 311–326.

https://doi.org/10.1080/1359866X.2011.614685

Carrillo, C., & Flores, M. A. (2020). COVID-19 and teacher education: A literature review of online teaching and learning practices. *European Journal of Teacher Education*, *43*(4), 466–487. https://doi.org/10.1080/02619768.2020.1821184

Deshpande, S., & Shesh, A. (2021). Blended Learning and Analysis of Factors Affecting the Use of ICT in Education. In *Next Generation Information Processing System* (pp. 311–324). Springer. https://doi.org/10.1007/978-981-15-4851-2_33

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology*

*Systems*, *49*(1), 5–22.

https://doi.org/10.1177/0047239520934018

Donitsa-Schmidt, S., & Ramot, R. (2020). Opportunities and challenges: teacher education in Israel in the Covid-19 pandemic. *Journal of Education for Teaching*, *46*(4), 586–595.

https://doi.org/10.1080/02607476.2020.1799708

Dorsah, P. (2021). Pre-Service Teachers' Readiness for Emergency Remote Learning in the Wake of COVID-19. *European Journal of STEM Education, 6*(1). https://doi.org/10.20897/ejsteme/9557

Ellis, V., Steadman, S., & Mao, Q. (2020). 'Come to a screeching halt': Can change in teacher education during the COVID-19 pandemic be seen as innovation? *European Journal of Teacher Education*, *43*(4), 559–572. https://doi.org/10.1080/02619768.2020.1821186

Facey-Shaw, L., & Pitter, G. (2023). Modeling Technology-Enhanced Instruction to Pre-Service Teachers: Reflection on Lessons Learned during the COVID-19 Pandemic. *International Journal of Education and Development Using Information and Communication Technology*, *19*(2), 166–176. https://doi.org/10.20897/ejsteme/9557

Hsu, C., Lan, Y.-J., & Tseng, M. (2021). A Preliminary Study of Pre-Service Teachers' Development and Reflections on Online Teaching. In *Expanding Global Horizons Through Technology Enhanced Language Learning* (pp. 163–175). Springer. https://doi.org/10.1007/978-981-15-7579-2_9

Hughes, S. P., Corral-Robles, S., & Ortega-Martín, J. L. (2023). Let's Get Digital: ICT Training Needs in Pre-Service Language Teaching. *Education Sciences*, *13*(12), 1238. https://doi.org/10.3390/educsci13121238

Kidd, W., & Murray, J. (2020). The Covid-19 pandemic and its effects on teacher education in England: How teacher educators moved practicum learning online. *European Journal of Teacher Education*, *43*(4), 542–558. https://doi.org/10.1080/02619768.2020.1820480

Kim, J. (2020). Learning and teaching online during Covid-19: Experiences of student teachers in an early childhood education practicum. *International Journal of Early Childhood*, *52*(2), 145–158. https://doi.org/10.1007/s13158-020-00272-6

König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, *43*(4), 608–622. https://doi.org/10.1080/02619768.2020.1809650

Kumari, P., & Naaz, I. (2021). ICT for pre-service and in-service teachers: Implications and challenges. *Teacher Education Generation next: Perspectives, Opportunities and Challenges*, 160–168.

Mavuru, L., Pila, O. K., & Kuhudzai, A. G. (2022). Pre-Service Teachers" Levels of Adaptations to Remote Teaching and Learning at A University in A Developing Country in the Context of COVID-19. *International Journal of Higher Education*, *11*(1). https://doi.org/10.5430/ijhe.v11n1p12

Milad, M. (2019). The pedagogical development of blended learning. In Hidri, S. (eds) *English Language Teaching Research in the Middle East and North Africa* (pp. 609–635). Springer. https://doi.org/10.1007/978-3-319-98533-6_27

Mohamad Nasri, N., Husnin, H., Mahmud, S. N. D., & Halim, L. (2020). Mitigating the COVID-19 pandemic: A snapshot from Malaysia into the coping strategies for pre-service teachers' education. *Journal of Education for Teaching*, *46*(4), 546–553.

https://doi.org/10.1080/02607476.2020.1802582

Moorhouse, B. L., Li, Y., & Walsh, S. (2023). E-Classroom Interactional Competencies: Mediating and Assisting Language Learning During Synchronous Online Lessons. *RELC Journal, 54*(1), 114-128. https://doi.org/10.1177/0033688220985274

Moudgalya, K. M. (2020). ICT for Education, Employment and Empowerment in India. In Looi, CK., Zhang, H., Gao, Y., Wu, L. (eds) *ICT in Education and Implications for the Belt and Road Initiative* (pp. 53–71). Springer. https://doi.org/10.1007/978-981-15-6157-3_4

Mphuthi, M., & Tshelane, M. (2023). Online educational technologies as a curriculum approach in teaching and learning for first year pre-service teachers. *Edulearn23 Proceedings*, 8582–8589. http://doi.org/10.21125/edulearn.2023.0655

Ogbonnaya, U. I., Awoniyi, F. C., & Matabane, M. E. (2020). Move to online learning during COVID-19 lockdown: Pre-service teachers' experiences in Ghana. *International Journal of Learning, Teaching and Educational*

*Research*, *19*(10), 286–303. *https://doi.org/10.26803/ijlter.19.10.16*

Rahimi, A. R., & Mosalli, Z. (2024). The role of twenty-first century digital competence in shaping pre-service teacher language teachers' twenty-first century digital skills: the Partial Least Square Modeling Approach (PLS-SEM). *Journal of Computers in Education*, 1–25. https://doi.org/10.1007/s40692-023-00307-6

Ranjan, P. (2020). Is Blended Learning Better than Online Learning for B. Ed Students?. *Journal of Learning for Development*, *7*(3), 349–366.

Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. *Computers & Education*, *144*, 103701.

  https://doi.org/10.1016/j.compedu.2019.103701

Sahoo, S. (2020). E-readiness and perception of student teachers' towards online learning in the midst of COVID-19 pandemic. *Available at SSRN 3666914*. https://dx.doi.org/10.2139/ssrn.3666914

Sarangapani, P. M., Thirumalai, B., Ramanathan, A., Kumar, R., & Ramchand, M. (2021). *No teacher, no class: State of the education report for India 2021*. New Delhi: UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000379115/PDF

Scull, J., Phillips, M., Sharma, U., & Garnier, K. (2020). Innovations in teacher education at the time of COVID19: an Australian perspective. *Journal of Education for Teaching*, *46*(4), 497–506. https://doi.org/10.1080/02607476.2020.1802701

Şentürk, C. (2021). Effects of the blended learning model on preservice teachers' academic achievements and twenty-first century skills. *Education and Information Technologies*, *26*(1), 35–48. https://doi.org/10.1007/s10639-020-10340-y

Seth, N. (2018). Technology Integration in Language Teaching: A Negotiated Terrain. In *Dynamic Learning Spaces in Education* (pp. 69–86). Springer. https://doi.org/10.1007/978-981-10-8521-5_4

Sharma, A. (2022). *Information and Communications Technology for Teacher Training in India*. ICT India Working Paper.

Wang, J., & Wang, Y. (2021). Compare synchronous and asynchronous online instruction for science teacher preparation. *Journal of Science Teacher Education*, *32*(3), 265–285. https://doi.org/10.1080/1046560X.2020.1817652

Yeop, M. A., Wong, K.-T., & Goh, P. S. C. (2016). Blended learning: pedagogy, learning styles, and assessment activities in the classroom. *International Journal of Advanced and Applied Sciences*, *33*(11), 36–39.

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**Lalitha Devi Bommanaboina** is an Assistant Professor at Madanapalle Institute of Technology and Sciences. She submitted her thesis successfully and completed coursework. She earned her Post Graduate Diploma in the Teaching of English (PGDTE) from EFLU Hyderabad. Her academic journey includes an M.A. in English Language and Literature and a B.A. in English Literature. With a rich academic and research background, Lalitha has also contributed to the field of education through her 5 years of teaching experience. She was a trained master trainer by the British Council. Her research interests include teacher education, TBLT, language assessment, and blended language learning and teaching.

**Dr. Ramya Devi Bommanaboina** is an Assistant Professor at Siksha O Anusandhan University, Bhubaneswar, Odisha, India. Her research interests are Second Language Writing, Educative Technology, and Teacher Education. She is an interactive teacher and strongly believes that learning is enriched through collaboration. She completed a PG diploma course in teaching English (PGDTE) from English and Foreign Languages University (EFLU), Hyderabad. In 2017, she was selected for a pilot project initiated by APSCHE (Andhra Pradesh State Council for Higher Education) in collaboration with the British Council, India. After receiving the rigorous training, she was entitled to the post of "Master Trainer"; and supposed to train lecturers of various engineering colleges in Andhra Pradesh. This experience tremendously helped her in classroom teaching.