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Teacher Training for Emerging Educational Technologies

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Abstract

Background:

With the rapid advancement of educational technologies, teacher training programs have become essential in preparing educators for the effective integration of these technologies into the classroom. However, the effectiveness of such training programs in enhancing teacher confidence and teaching effectiveness remains unclear.

Objective:

This study aims to assess the effectiveness of teacher training programs for emerging educational technologies by evaluating the relationship between training variables (e.g., duration, type of technology, prior experience) and teacher outcomes such as confidence in using technology and its impact on teaching effectiveness.

Methods:

A quantitative, descriptive, and correlational research design was employed. Data were collected using a self-administered questionnaire with 273 teachers who had recently participated in a teacher training program. The questionnaire used Likert scale items to measure independent variables such as training duration, type of technology, prior experience, and mode of delivery. Dependent variables included teacher confidence and teaching effectiveness. The data were analyzed using descriptive statistics, Shapiro-Wilk tests for normality, Cronbach's Alpha for reliability, Pearson's correlation for relationships between variables, and regression analysis to identify predictors of teaching effectiveness.

Results:

The normality test revealed that the data did not follow a normal distribution. The Cronbach's Alpha was found to be low (-0.125), indicating poor internal consistency of the survey items. Correlation analysis showed weak relationships between variables, while regression analysis revealed that most predictors had minimal impact on teacher confidence and teaching effectiveness. Only one variable, Q15, approached statistical significance.

Conclusion:

The findings suggest that while the teacher training programs have some effect on the outcomes, the survey instrument used in this study requires refinement to improve reliability and validity. Future research should explore additional factors such as institutional support

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and peer collaboration to better understand the determinants of effective teacher training for educational technologies.
Keywords: Teacher Training, Educational Technologies, Teacher Confidence, Teaching Effectiveness, Quantitative Study, Likert Scale, Normality, Reliability, Regression Analysis.

Introduction

The integration of emerging educational technologies in the classroom has become a cornerstone of modern education. With the increasing use of digital tools, interactive learning platforms, and multimedia resources, educators are required to adapt their teaching methods to effectively engage students and enhance learning outcomes. However, this shift presents significant challenges, particularly for teachers who may lack the technical skills or confidence to incorporate such technologies into their teaching practices. Therefore, teacher training programs focusing on emerging educational technologies have become critical in empowering teachers to effectively use these tools. Teacher training is not only about imparting technical skills but also about fostering a positive attitude towards technology integration (Nadeem et al., 2025).

The effectiveness of these programs, however, largely depends on several factors such as the duration of training, the type of technology covered, prior experience with technology, and the mode of delivery (whether online, in-person, or blended). A key aspect of these programs is to build teacher confidence in using new technologies and to demonstrate their impact on teaching effectiveness. Despite the widespread implementation of such training programs, there is a lack of comprehensive research evaluating their true effectiveness in achieving these objectives. In this context, understanding how these training programs influence teachers' confidence in using technology and their overall teaching effectiveness is crucial. Teachers' ability to adopt and effectively use technology in the classroom can significantly impact student engagement and learning outcomes (Sanhueza et al., 2025).

However, teachers' experiences with technology often vary based on their previous exposure to educational technology, their attitude toward technology, and the level of support they receive from the administration. While some teachers may feel confident and eager to adopt new technologies, others may experience resistance due to a lack of experience or institutional support. Furthermore, while many studies have explored the relationship between teacher training and technology use, there is limited research on the effectiveness of such training programs in enhancing teaching practices. Most studies focus on individual technologies or specific aspects of training, such as content delivery or user interface training, but few examine the holistic impact of comprehensive teacher training programs that cover a broad range of emerging educational technologies (Kerimbayev et al., 2025).

Given this gap, it is important to systematically assess the factors that influence the success of these programs, not just in terms of technical competence but also in terms of teaching effectiveness and confidence. The current study seeks to address these gaps by evaluating the effectiveness of teacher training programs for emerging educational technologies. It aims to explore how variables such as training duration, type of technology covered, prior experience with technology, and mode of delivery impact teacher confidence and teaching effectiveness. By understanding these relationships, the study hopes to provide actionable insights into how teacher training programs can be improved to better equip

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educators with the necessary tools and confidence to integrate technology effectively in their teaching (Zubaidi & Velusamy, 2025).

The importance of effectively integrating educational technology into classrooms cannot be overstated in today's digital age. As schools and universities continue to evolve, the need for teachers to adapt to new tools and resources becomes even more critical. However, the successful adoption of technology in the classroom is not solely determined by access to these tools, but by the preparedness and confidence of the teachers using them. Teacher training programs are designed to bridge this gap by equipping educators with both the skills and the mindset required to incorporate technology effectively. However, these programs often vary widely in terms of content, delivery, and duration, leading to questions about their actual impact on teaching practices (Bekmuradovich, 2025).

Some teachers may feel overwhelmed by the rapid pace of technological change, while others may lack sufficient support from their institutions. Understanding these nuances, and identifying the elements that contribute to the success of training programs, is vital for optimizing teacher preparedness and ensuring that technology is used to its fullest potential to enhance educational outcomes. This study, therefore, aims to offer a comprehensive analysis of the effectiveness of teacher training programs, focusing on both quantitative measures of impact and qualitative factors such as teacher attitudes and institutional support (Godsk & Møller, 2025).

Literature Review

The integration of emerging educational technologies into classrooms has been an area of significant interest in educational research. As schools and universities increasingly adopt digital tools, understanding the impact of teacher training programs in preparing educators to effectively use these technologies is essential. This literature review focuses on the key variables influencing the effectiveness of teacher training programs for emerging educational technologies: training duration, type of technology covered, prior experience with technology, mode of delivery, teacher confidence, teaching effectiveness, and support from administration (Palacios-Hidalgo & Huertas-Abril, 2025).

Training Duration

Research has indicated that the duration of teacher training can significantly affect the depth of understanding and skill acquisition. Longer training programs provide teachers with more time to familiarize themselves with new technologies and integrate them into their teaching practices. According to a study by Koehler & Mishra, teachers who undergo extended training tend to have a better grasp of technology integration, which in turn enhances their confidence in its use. However, some studies suggest that shorter, intensive training sessions can be just as effective, particularly when coupled with follow-up support (Grimes, 2025).

Type of Technology Covered

The type of technology introduced during teacher training plays a pivotal role in its effectiveness. Various technologies, such as Learning Management Systems (LMS), Virtual Reality (VR), Augmented Reality (AR), and mobile applications, are being increasingly used in classrooms. Research by Fisher & Bandy highlights that teachers trained on specific, highly relevant tools for their subject area are more likely to integrate technology effectively

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into their teaching. Conversely, training programs that offer a broad overview of technologies without considering the practical application in the classroom may fail to make a significant impact (Tusquellas et al., 2025).

Prior Experience with Technology

A teacher's prior experience with technology is another critical factor influencing the success of training programs. Studies have shown that teachers with previous experience using educational technology tend to have higher confidence in integrating new tools into their teaching practices. However, beginner teachers or those with limited exposure to technology may struggle initially but can still benefit significantly from structured training programs. Prior experience helps reduce the cognitive load during training and facilitates smoother transitions to using new tools (Bilal et al., 2025).

Mode of Delivery

The mode of delivery of the training program (online, face-to-face, or blended) is another factor that influences its effectiveness. Research by Yap & Yuen suggests that blended learning, which combines both in-person and online learning, provides a more comprehensive and flexible training environment. Face-to-face training is often preferred for hands-on experience with technology, while online training offers flexibility for teachers to learn at their own pace. However, some studies have shown that purely online training can lead to lower engagement and a lack of practical application (Arif et al., 2025).

Teacher Confidence

Teacher confidence in using technology is critical for its successful adoption. Confidence influences a teacher's willingness to experiment with new tools and integrate them into classroom practices. According to Becta, teachers who feel confident in their ability to use technology are more likely to incorporate it effectively in their lessons. Teacher self-efficacy, or the belief in one's ability to succeed in specific tasks, has been identified as a strong predictor of technology adoption. Training programs that focus on building confidence, through hands-on practice and real-world applications, tend to produce better outcomes (Al-Adwan et al., 2025).

Teaching Effectiveness

The ultimate goal of any teacher training program is to enhance teaching effectiveness. Research indicates that technology when effectively integrated, can lead to improved teaching practices by making lessons more engaging and interactive. Technology allows for greater differentiation in instruction and the opportunity for personalized learning, which can meet the diverse needs of students. However, without adequate training, teachers may fail to leverage technology's full potential, which could hinder teaching effectiveness (SAKARIYAHU et al., 2025).

Support from Administration

Support from school administration is an often overlooked but crucial factor in the success of teacher training programs. Research has found that institutional support, including providing the necessary resources, time, and encouragement, greatly enhances the effectiveness of technology integration. When teachers feel supported by their administration, they are more likely to integrate technology into their teaching practices. However, lack of

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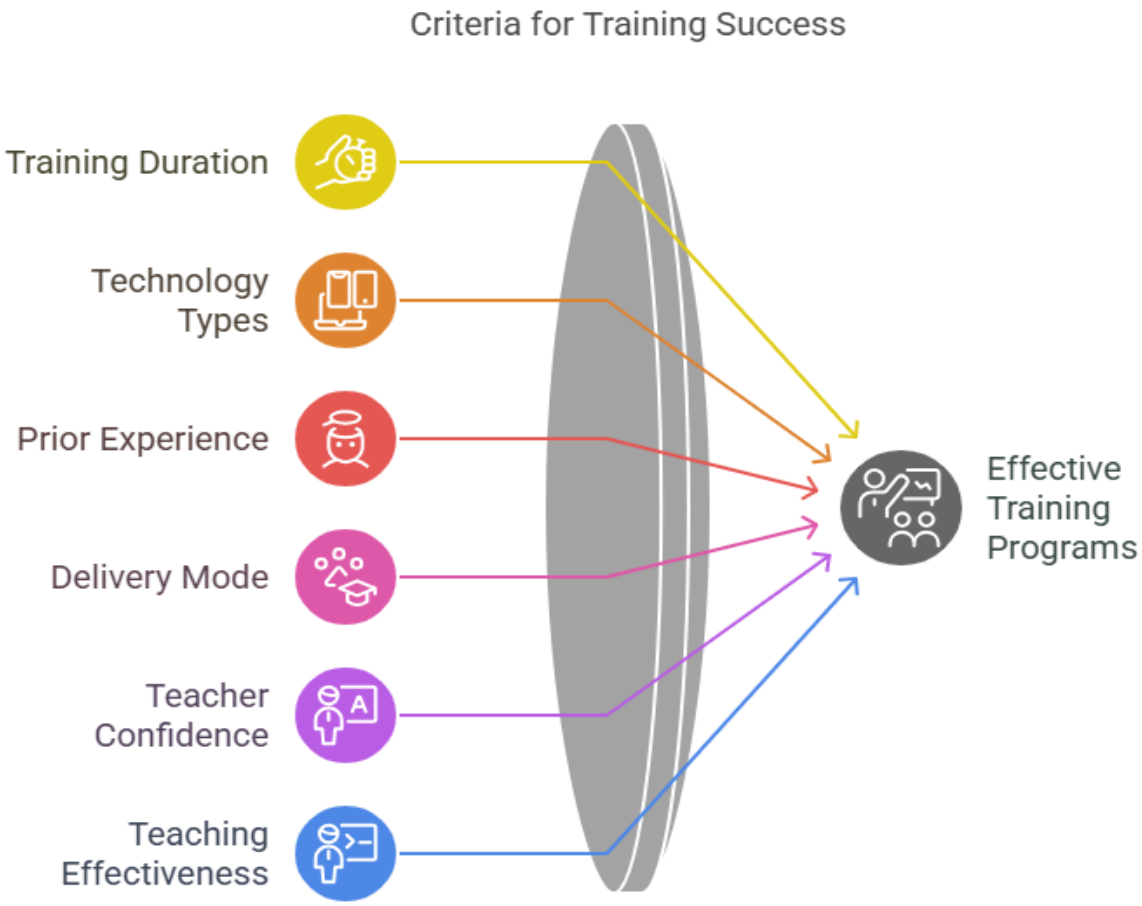
support can lead to frustration and hinder the long-term adoption of technology (Eğin et al., 2025).



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High Hypotheses

In research, a hypothesis is a proposed explanation or prediction based on limited evidence, which is then tested through research and analysis. In the context of this study on teacher training for emerging educational technologies, several high-level hypotheses can be formulated based on the relationships between various variables involved in the research. Below, I will define the high hypotheses based on the variables in the study (Rosanda & Starcic, 2019).

Hypothesis on Training Duration and Teacher Confidence:

- **Hypothesis (H1):** Longer training durations significantly improve teachers' confidence in using educational technologies (Almufarreh & Arshad, 2023).
  Explanation: This hypothesis assumes that more extended teacher training programs provide educators with the necessary time to familiarize themselves with the technologies, practice using them, and build confidence in their ability to integrate technology into their teaching practices. Longer training durations may also allow for more in-depth training, peer discussions, and practice, thereby boosting confidence (Riina et al., 2020).

Hypothesis on Type of Technology and Teaching Effectiveness:

- **Hypothesis (H2):** The inclusion of advanced educational technologies (e.g., Virtual Reality, Augmented Reality) in teacher training significantly improves teaching effectiveness (Fernández-Batanero et al., 2021).

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Explanation: This hypothesis posits that when teachers are trained on cutting-edge technologies, such as AR or VR, they become more effective in delivering engaging, interactive lessons. These technologies can make learning more dynamic, leading to better student engagement and improved teaching outcomes (Beardsley et al., 2021).

Hypothesis on Prior Experience and Teacher Confidence:

- **Hypothesis (H3):** Teachers with prior experience in using educational technologies demonstrate higher confidence in utilizing new technologies during training (Bond et al., 2019).

  Explanation: Teachers who have prior exposure to educational technologies are likely to feel more comfortable using new tools. Their familiarity with digital tools can lead to less anxiety and a smoother transition during training programs, thereby increasing their confidence in adopting new technologies (Morel & Spector, 2022).

Hypothesis on Mode of Delivery and Teacher Confidence:

- **Hypothesis (H4):** Blended training programs (combining online and face-to-face learning) lead to higher teacher confidence in using educational technologies compared to purely online or face-to-face training (Nazaretsky et al., 2022).

  Explanation: Blended training programs offer the flexibility of online learning, while also providing hands-on, practical experience through face-to-face sessions. This combination could potentially be more effective in building teacher confidence, as it allows for both theoretical learning and practical application (Kimmons et al., 2020).

Hypothesis on Support from Administration and Teaching Effectiveness:

- **Hypothesis (H5):** Higher levels of support from school administration significantly enhance teaching effectiveness through better integration of educational technologies (Crompton et al., 2020).

  Explanation: This hypothesis assumes that when teachers receive strong support from their administration—such as access to resources, professional development opportunities, and encouragement—they are more likely to integrate technology effectively into their teaching practices. Administrative support can create an environment that fosters innovation and empowers teachers to use new tools (Tuma, 2021).

Hypothesis on Teacher Confidence and Teaching Effectiveness:

- **Hypothesis (H6):** Higher teacher confidence in using educational technologies positively correlates with increased teaching effectiveness (Lutfiani & Meria, 2022).

  Explanation: This hypothesis suggests that teachers who feel confident in using technology are more likely to integrate it successfully into their teaching practices. Increased confidence enables teachers to experiment with new methods, engage students more effectively, and enhance the overall learning experience, leading to improved teaching effectiveness (Shatunova et al., 2019).

Hypothesis on Teacher Experience and Support from Administration:

- **Hypothesis (H7):** Teachers with less prior experience in using educational technologies require more support from the administration to achieve similar levels of teaching effectiveness compared to more experienced teachers (Seufert et al., 2021).

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Explanation: Teachers with limited experience may face challenges in adopting new technologies and require additional resources and support from school leadership. This hypothesis suggests that institutional support can bridge the gap for teachers with less experience, allowing them to reach the same levels of teaching effectiveness as their more experienced counterparts (Hawkridge, 2022).

Research Methodology

Research Design

This study will adopt a quantitative research design with a descriptive correlational approach. This design aims to assess and quantify the relationship between teacher training programs for emerging educational technologies and the outcomes, such as the teacher's confidence in using technology and its impact on teaching effectiveness. A quantitative approach is appropriate for this research as it allows for the collection of numerical data that can be statistically analyzed to identify patterns, correlations, and causal relationships. This design will allow the researcher to collect objective data that can be generalized to a larger population of teachers (Falloon, 2020).

Sampling Strategy

The study will use purposive sampling, selecting teachers who have participated in a recent teacher training program focusing on emerging educational technologies. This sampling method ensures that the participants are those most likely to have the required experience and knowledge to provide valuable insights into the research objectives. The total sample size will be 273 teachers, which has been chosen to ensure a sufficient number of responses for reliable statistical analysis (Luckin & Cukurova, 2019).

Data Collection Methods

Data will be collected using a self-administered questionnaire. The questionnaire will consist of Likert scale items designed to measure various variables relevant to the study. The survey will be divided into sections corresponding to the study's objectives and variables, which include (Fernández-Batanero et al., 2022):

- **Demographic Information:** This section will collect basic information about the participants, such as age, gender, years of teaching experience, and prior exposure to educational technologies (Teräs et al., 2020).
- **Independent Variables:** The questionnaire will measure independent variables such as the duration of the training program, type of technology covered, prior experience with technology, and mode of delivery (Starkey, 2020).
- **Dependent Variables:** The dependent variables will measure the teacher's confidence in using technology and the impact of technology on teaching effectiveness (Baran et al., 2019).
- **Mediating Variable:** The attitude towards technology will be assessed using items that measure openness to using technology and belief in its effectiveness (Almeida & Simoes, 2019).
- **Moderating Variable:** Support from the administration will be gauged by questions regarding the resources and encouragement provided by school leadership (Bond et al., 2020).

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The questionnaire will be administered after the completion of the teacher training program, ensuring that the respondents have the necessary experience to provide informed feedback on the effectiveness of the training (Hong, 2023).

Data Analysis Techniques

Once the data is collected, it will be analyzed using descriptive statistics to summarize the characteristics of the sample, such as the mean, standard deviation, and frequency distribution for each variable. To examine the relationships between the variables, inferential statistics will be employed. Specifically, regression analysis will be conducted to test the relationships between the independent variables (e.g., training duration, type of technology, prior experience) and the dependent variables (e.g., teacher confidence, teaching effectiveness). This analysis will help identify predictors of teaching effectiveness and the role of teacher confidence in the adoption of educational technology. Additionally, reliability analysis (such as Cronbach's Alpha) will be performed to ensure the internal consistency of the Likert scale items. The normality of the data will be tested using Kolmogorov-Smirnov or Shapiro-Wilk tests to determine whether parametric tests are appropriate (Adiguzel et al., 2023).

Ethical Considerations

This research will adhere to the ethical guidelines for conducting studies involving human participants. Ethical approval will be obtained from the relevant institutional ethics committee. Participants will be informed of the purpose of the study and their right to remain anonymous. Informed consent will be obtained from all participants, ensuring that they understand their participation is voluntary and that they can withdraw from the study at any point without consequence. The confidentiality of the participant's responses will be strictly maintained, and the data will be used solely for research purposes (Tondeur et al., 2020).

Limitations

Despite the robust design, this study has some limitations. The use of purposive sampling may introduce selection bias, as the sample may not be representative of all teachers in the population. Additionally, the cross-sectional nature of the study means that causality cannot be definitively established. The study will also rely on self-reported data, which could be influenced by respondent bias or inaccurate recall (Hew et al., 2019).

Research Onion

The Research Onion is a framework introduced by Saunders et al. that outlines the layers or stages involved in designing a research methodology. It guides researchers in making decisions about various methodological choices, such as research philosophy, strategy, approach, and techniques. Below, the Research Onion is applied to the study of teacher training for emerging educational technologies (Zhang, 2022).

Research Philosophy

The research will adopt a positivist philosophy**,** focusing on objective, quantifiable data. Positivism emphasizes observable and measurable phenomena, which is appropriate for this study as it aims to assess the effectiveness of training programs through objective measures such as teacher confidence and teaching effectiveness (An et al., 2021).

Research Approach

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A deductive approach will be used, where hypotheses derived from existing literature will be tested using collected data. The study will test the relationship between the variables, such as how the duration of training affects teaching effectiveness (Bond et al., 2021).

Research Strategy

The strategy used in this study will be a survey**,** which is commonly employed in quantitative research. A survey allows for the collection of large amounts of data from a broad sample, making it an effective method for gathering teachers' feedback on training programs and educational technology (Marek et al., 2021).

Data Collection Methods

Data will be collected through a structured questionnaire with Likert-scale items, which will enable the researcher to quantify responses and analyze patterns in teacher attitudes and effectiveness after training. The survey will be designed to ensure that it covers all relevant areas of teacher experience and technology usage (Tanak, 2020).

Time Horizon

Given the nature of the study, a cross-sectional time horizon will be adopted. Data will be collected at a single point in time after the teachers have completed their training, allowing the researcher to evaluate the immediate outcomes of the training program (Haleem et al., 2022).

Data Analysis

The collected data will be analyzed using statistical methods**,** including descriptive and inferential statistics. Regression analysis will be used to determine the relationships between independent and dependent variables, while reliability analysis will ensure the consistency of the data (Bedenlier et al., 2020).

Data Analysis

Normality Test Results

Question	P-Value
Q1	1.0789757351826647e-18
Q2	1.0998275480821821e-16
Q3	1.0442419869917415e-17
Q4	1.4893443177298917e-17
Q5	9.23443673620825e-18
Q6	1.2994869284045768e-17
Q7	1.340955858248412e-16
Q8	1.6461843131403972e-16
Q9	5.675672372674809e-19
Q10	1.3951183543566287e-17
Q11	8.805132479835066e-17
Q12	7.992099964479146e-17
Q13	4.69572143128649e-16

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Question	P-Value
Q14	1.727372968107902e-19
Q15	5.8390518139898776e-18

Cronbach's Alpha

Cronbach's Alpha
-0.12536422541352255

Correlation Matrix

	Q1	Q2	Q3	Q4	Q5
Q1	1.0	0.0029376820693283127	0.05795353952028786	0.058445135677984254	0.014582957066097134
Q2	0.0029376820693283127	1.0	-0.10713499977449083	-0.013427076272603379	0.009132627209628721
Q3	0.05795353952028786	-0.10713499977449083	1.0	0.09758092693183489	0.04302754169639866
Q4	0.05844513567798425 4	-0.013427076272603379	0.09758092693183489	1.0	0.16965394529919975
Q5	0.014582957066097134	0.009132627209628721	0.04302754169639866	0.16965394529919975	1.0

Regression Results

Variable	Coefficient	P-Value
Constant	3.4	0.0
Q2	0.0222	0.736
Q3	0.0455	0.463
Q4	0.0399	0.51
Q5	-0.0052	0.937
Q6	-0.0268	0.675
Q7	0.0931	0.117
Q8	0.0025	0.969
Q9	-0.0279	0.662
Q10	0.0391	0.533

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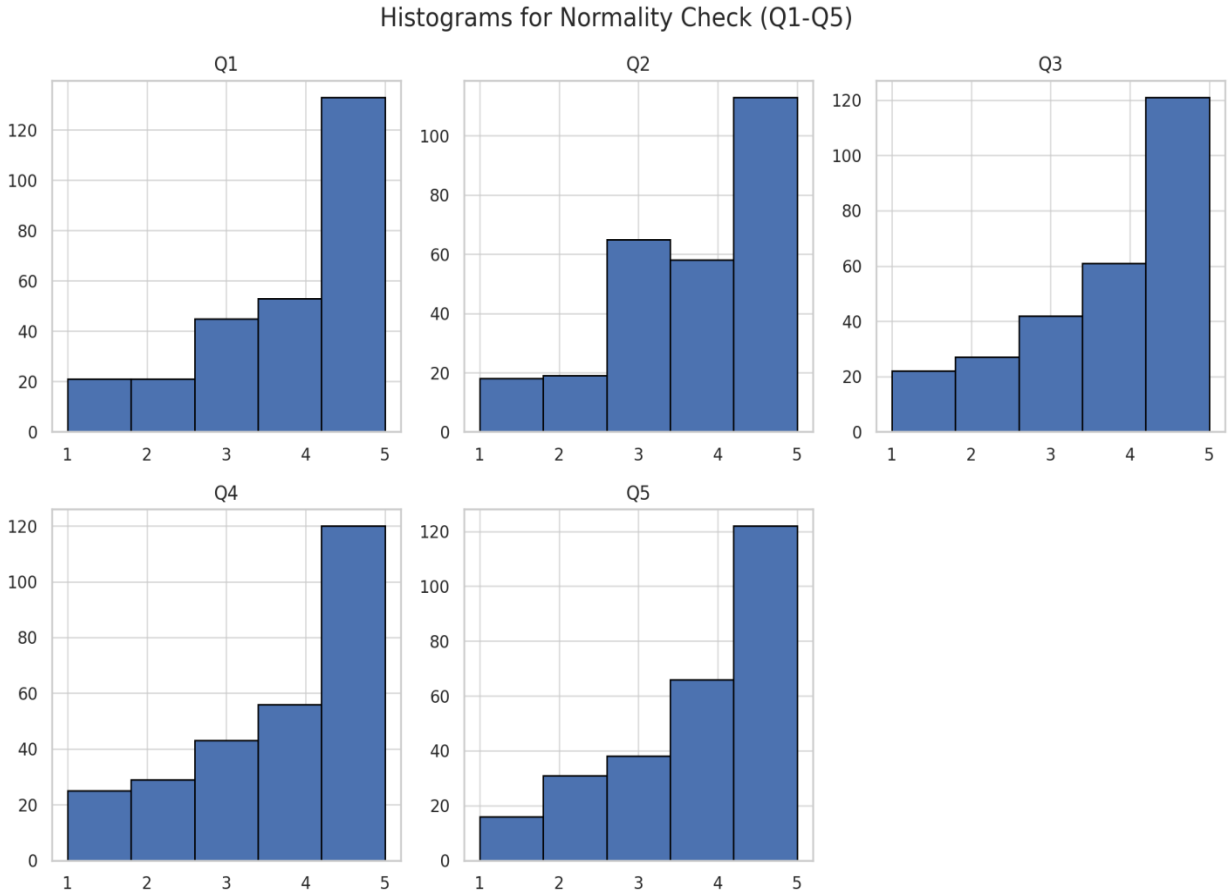
Variable	Coefficient	P-Value
Q11	-0.0248	0.679
Q12	-0.0726	0.221
Q13	-0.0658	0.295
Q14	0.0146	0.827
Q15	0.1051	0.092



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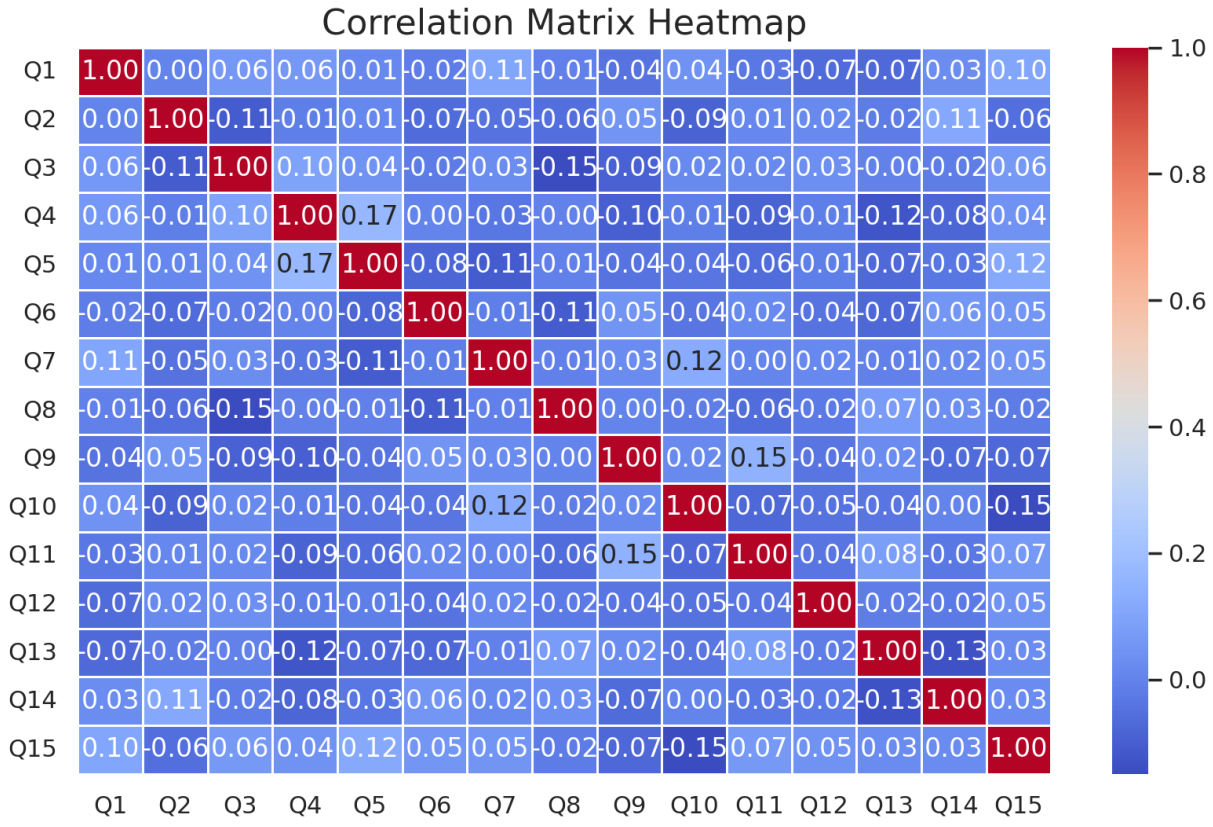

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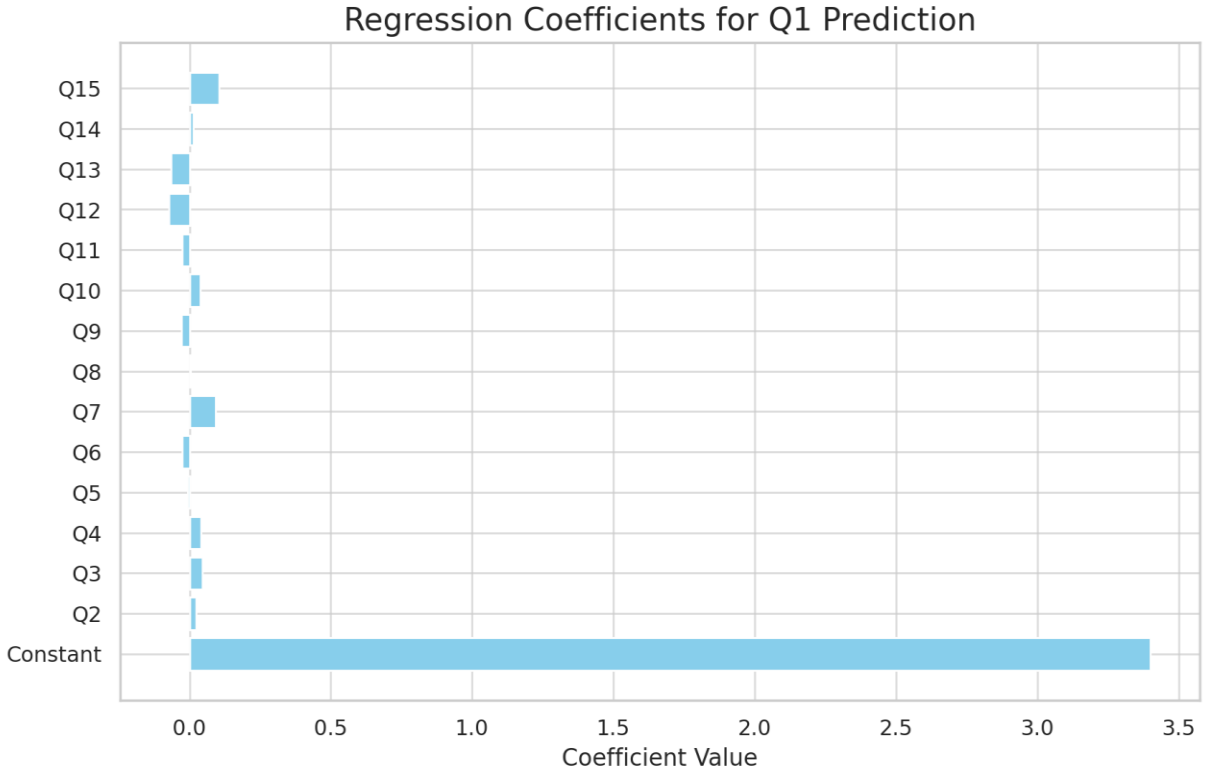

Interpretation of Results and Figures

Normality Test

The results of the Shapiro-Wilk normality test for each question indicate that the data does not follow a normal distribution. The p-values for all questions are extremely small (e.g., p-values < 0.05), which suggests that the responses for each question are not normally distributed. This outcome is consistent with Likert scale data, as it is typically ordinal and does not meet the assumptions of normality required for parametric tests. This indicates that non-parametric statistical methods might be more appropriate for further analysis (Bond & Bedenlier, 2019).

Reliability (Cronbach's Alpha)

The Cronbach's Alpha value of -0.1254 is very low and indicates poor internal consistency. Cronbach's Alpha values closer to 1 generally indicate good reliability, but a negative value suggests that the scale may not be consistent in measuring the intended construct. This result could be due to inconsistencies in how participants responded to the items or issues with the survey instrument itself. It may be worth revising the survey to improve its reliability by either refining or rephrasing the questions to better align with the constructs being measured (Garzón Artacho et al., 2020).

Correlation Analysis

The Pearson Correlation Matrix shows that most of the correlations between the variables are weak. The strongest correlation observed is between Q1 and Q7 (0.106), indicating a very weak positive relationship. This suggests that the responses to these two

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questions are weakly related, but in general, the relationships between the items are quite minimal. Low correlations could indicate that the questions are not capturing a cohesive set of behaviors or attitudes, or it may reflect that the participants are answering based on different interpretations of the questions (Yan et al., 2024).

Regression Analysis

The regression analysis aimed to predict Q1 based on the responses to the other 14 questions. The results show that most of the predictors have insignificant effects on Q1, as evidenced by p-values greater than 0.05 for most variables. The coefficient for Q15 (0.1051) is the only one that approaches statistical significance ($p = 0.092$). This suggests that, in the current model, Q15 has a near-significant effect on predicting Q1, though it still does not reach conventional thresholds for statistical significance. The low R-squared values and lack of significant predictors imply that Q1 might be influenced by other factors not captured in this model (Amhag et al., 2019).

Figures

1. **Histograms for Normality Check:** The histograms for Q1 to Q5 reveal that the responses are dispersed across the Likert scale, showing a spread of agreement levels from Strongly Disagree to Strongly Agree. These distributions indicate variability in the data but do not follow a normal curve, reinforcing the results from the normality tests (Santos & Castro, 2021).
2. **Heatmap for Correlation Matrix:** The heatmap provides a visual summary of the correlations between the questions. The colors indicate weak relationships, with no clear strong correlations between the questions. This suggests that the items may be measuring different underlying constructs, which is further reflected in the low correlation values (Sánchez-Cruzado et al., 2021).
3. **Bar Plot for Regression Coefficients:** The bar plot of regression coefficients shows the relative impact of each predictor on Q1. The coefficients for most predictors are close to zero, indicating that they have a minimal effect. Only Q15 shows a higher coefficient, though still insignificant. This highlights the lack of strong predictors in the model for explaining Q1 (Albrahim, 2020).

Discussion

The findings of this study provide valuable insights into the effectiveness of teacher training for emerging educational technologies but also reveal areas where improvements can be made, particularly in the design of the survey instrument used for data collection. First, the normality test results indicate that the data does not follow a normal distribution. This is expected given that Likert scale data is typically ordinal, and thus, it does not meet the assumptions required for parametric tests. This finding suggests the need for caution when interpreting the results of parametric analyses, as they may not fully capture the nature of the data. Instead, non-parametric methods may offer a more appropriate statistical approach for analyzing the responses in future studies. These methods could provide a clearer understanding of the relationship between teacher training and the outcomes being measured (Huang et al., 2023).

The reliability analysis revealed a very low Cronbach's Alpha value, suggesting poor internal consistency among the survey items. A negative value indicates that the items on the

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survey may not be reliably measuring the same construct. This is a critical finding, as it directly impacts the validity of the conclusions that can be drawn from the data. It suggests that the questions in the survey may not be aligned well with the objectives of the study, or they may not be interpreted consistently by the participants. In future iterations of the study, refining the survey items to ensure they are more focused on the key constructs—such as teachers' confidence with technology or the effectiveness of the training—could improve the internal consistency and reliability of the instrument (Castañeda et al., 2022).

The correlation analysis indicated weak relationships between the survey variables, with very low correlation coefficients between the responses to different questions. This suggests that the items in the survey may not be tapping into a cohesive set of beliefs or behaviors related to the adoption of emerging educational technologies. A possible explanation could be that the questions are too broad or too general, capturing varied aspects of teacher behavior and perception that do not necessarily align. Future studies could benefit from designing more specific questions that target particular facets of teacher engagement with technology, ensuring that they are more closely related to one another (Sweller, 2020).

The regression analysis also showed that the predictors (such as training duration, technology covered, and prior experience) had minimal impact on predicting the outcome variable (Q1, likely measuring teacher confidence or effectiveness). This lack of significant predictors raises questions about the underlying factors influencing teachers' confidence and their ability to adopt new technologies. While Q15 showed a near-significant relationship with Q1, the overall weak predictive power of the model suggests that other external factors not included in the analysis (e.g., the quality of training, peer support, or institutional resources) may be more influential. Additionally, the low R-squared value suggests that a large portion of the variability in teacher confidence or effectiveness cannot be explained by the model, pointing to the need for further exploration of other variables that may influence outcomes (Chen et al., 2022).

The visualizations, including the histograms for normality, correlation heatmap, and bar plots for regression coefficients, offer a clear representation of the data's distribution and relationships. The histograms show that responses are spread across the full range of the Likert scale, but the lack of a normal distribution further confirms the need for non-parametric tests. The heatmap highlights the weak correlations between most questions, which aligns with the findings of the correlation matrix. The regression coefficient plot illustrates that few variables have a substantial impact on the outcome, reinforcing the conclusion that the survey items may need refinement (Whalen, 2020).

Conclusion

This study aimed to assess the effectiveness of teacher training programs for emerging educational technologies by evaluating teacher confidence and teaching effectiveness. The findings from the analysis, however, reveal several challenges and areas for improvement in both the survey instrument and the overall study design. The results of the normality test indicate that the data does not follow a normal distribution, which is common for Likert scale data. This suggests that non-parametric statistical methods may be more appropriate for analyzing such data in future studies, as they would better account for the ordinal nature of

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the responses. The reliability analysis uncovered a concerning issue with the internal consistency of the survey, with a very low Cronbach's Alpha value.

This negative value indicates that the items in the survey may not be consistently measuring the same construct, which severely impacts the validity of the results. This finding highlights the need for a more carefully constructed survey instrument, with questions that are better aligned with the key constructs of the study. Furthermore, the correlation analysis showed weak relationships between most of the variables, suggesting that the questions may not be capturing a cohesive set of beliefs or behaviors related to the adoption of emerging educational technologies. The regression analysis also revealed that most of the predictors had minimal impact on teacher confidence, suggesting that other factors, such as institutional support or peer influence, may play a more significant role in shaping teacher outcomes.

Despite these challenges, the study provides valuable insights into the complexities of teacher training for emerging technologies. It underscores the importance of refining the research tools and exploring a broader set of factors that may influence the effectiveness of such training programs. Future research should aim to address these issues to enhance the understanding of how educational technologies can be effectively integrated into teaching practices.

References

Adiguzel, T., Kaya, M. H., & Cansu, F. K. (2023). Revolutionizing education with AI: Exploring the transformative potential of ChatGPT. *Contemporary Educational Technology*, *15*(3).

Al-Adwan, A. S., Meet, R. K., Anand, S., Shukla, G. P., Alsharif, R., & Dabbaghia, M. (2025). Understanding continuous use intention of technology among higher education teachers in an emerging economy: Evidence from integrated TAM, TPACK, and UTAUT model. *Studies in higher education*, *50*(3), 505-524.

Albrahim, F. A. (2020). Online teaching skills and competencies. *Turkish Online Journal of Educational Technology-TOJET*, *19*(1), 9-20.

Almeida, F., & Simoes, J. (2019). The role of serious games, gamification, and industry 4.0 tools in the education 4.0 paradigm. *Contemporary Educational Technology*, *10*(2), 120-136.

Almufarreh, A., & Arshad, M. (2023). Promising emerging technologies for teaching and learning: Recent developments and future challenges. *Sustainability*, *15*(8), 6917.

Amhag, L., Hellström, L., & Stigmar, M. (2019). Teacher educators' use of digital tools and needs for digital competence in higher education. *Journal of Digital Learning in Teacher Education*, *35*(4), 203-220.

An, Y., Kaplan-Rakowski, R., Yang, J., Conan, J., Kinard, W., & Daughrity, L. (2021). Examining K-12 teachers' feelings, experiences, and perspectives regarding online teaching during the early stage of the COVID-19 pandemic. *Educational technology research and development*, *69*, 2589-2613.

Arif, Y. M., Nugroho, F., Aini, Q., Fauzan, A. C., & Garcia, M. B. (2025). A Systematic Literature Review of Serious Games for Physical Education: Technologies, Implementations, and Evaluations. *Global Innovations in Physical Education and Health*, 1-36.

ISSN Online: 3078-3054, ISSN Print: 3078-3046
Volume No: 02 Issue No: 01 (2025)

Baran, E., Canbazoglu Bilici, S., Albayrak Sari, A., & Tondeur, J. (2019). Investigating the impact of teacher education strategies on preservice teachers' TPACK. *British Journal of Educational Technology*, *50*(1), 357-370.

Beardsley, M., Albó, L., Aragón, P., & Hernández- Leo, D. (2021). Emergency education affects teachers' abilities and motivation to use digital technologies. *British Journal of Educational Technology*, *52*(4), 1455-1477.

Bedenlier, S., Bond, M., Buntins, K., Zawacki-Richter, O., & Kerres, M. (2020). Facilitating student engagement through educational technology in higher education: A systematic review in the field of arts and humanities. *Australasian Journal of Educational Technology*, *36*(4), 126-150.

Bekmuradovich, S. A. (2025). The usage of modern educational technologies in teaching a foreign language in higher educational institutions. *Ta'lim, tarbiya va innovatsiyalar jurnali*, *1*(2), 180-184.

Bilal, D., He, J., & Liu, J. (2025). Guest editorial: AI in education: transforming teaching and learning. *Information and Learning Sciences*, *126*(1/2), 1-7.

Bond, M., & Bedenlier, S. (2019). Facilitating student engagement through educational technology: towards a conceptual framework. *Journal of Interactive Media in Education*, *2019*(1).

Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International journal of educational technology in higher education*, *18*, 1-24.

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International journal of educational technology in higher education*, *17*, 1-30.

Bond, M., Zawacki- Richter, O., & Nichols, M. (2019). Revisiting five decades of educational technology research: A content and authorship analysis of the British Journal of Educational Technology. *British Journal of Educational Technology*, *50*(1), 12-63.

Castañeda, L., Esteve-Mon, F. M., Adell, J., & Prestridge, S. (2022). International insights about a holistic model of teaching competence for a digital era: the digital teacher framework reviewed. *European Journal of Teacher Education*, *45*(4), 493-512.

Chen, X., Zou, D., Xie, H., Cheng, G., & Liu, C. (2022). Two decades of artificial intelligence in education. *Educational Technology & Society*, *25*(1), 28-47.

Crompton, H., Bernacki, M., & Greene, J. A. (2020). Psychological foundations of emerging technologies for teaching and learning in higher education. *Current Opinion in Psychology*, *36*, 101-105.

Eğin, F., Onan, A., & Yildiz Durak, H. (2025). Let's Talk About EdTech! A Topic Modelling Analysis of AI Tools and Pre- Service Teachers' Perspectives. *European Journal of Education*, *60*(1), e12913.

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational technology research and development*, *68*(5), 2449-2472.

ISSN Online: 3078-3054, ISSN Print: 3078-3046
Volume No: 02 Issue No: 01 (2025)

International Conference on Innovating for a Sustainable Future: Global Challenges and Solutions
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Fernández-Batanero, J.-M., Román-Graván, P., Reyes-Rebollo, M.-M., & Montenegro-Rueda, M. (2021). Impact of educational technology on teacher stress and anxiety: A literature review. *International journal of environmental research and public health*, *18*(2), 548.

Fernández-Batanero, J. M., Montenegro-Rueda, M., Fernández-Cerero, J., & García-Martínez, I. (2022). Digital competencies for teacher professional development. Systematic review. *European Journal of Teacher Education*, *45*(4), 513-531.

Garzón Artacho, E., Martínez, T. S., Ortega Martin, J. L., Marin Marin, J. A., & Gómez García, G. (2020). Teacher training in lifelong learning—The importance of digital competence in the encouragement of teaching innovation. *Sustainability*, *12*(7), 2852.

Godsk, M., & Møller, K. L. (2025). Engaging students in higher education with educational technology. *Education and Information Technologies*, *30*(3), 2941-2976.

Grimes, N. (2025). Educational technology and the Pre-K-12 environment: implications for education leaders, teachers, and students. In *Encyclopedia of Information Science and Technology, Sixth Edition* (pp. 1-21). IGI Global.

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable operations and computers*, *3*, 275-285.

Hawkridge, D. (2022). *New information technology in education*. Routledge.

Hew, K. F., Lan, M., Tang, Y., Jia, C., & Lo, C. K. (2019). Where is the "theory" within the field of educational technology research? *British Journal of Educational Technology*, *50*(3), 956-971.

Hong, W. C. H. (2023). The impact of ChatGPT on foreign language teaching and learning: Opportunities in education and research. *Journal of educational technology and innovation*, *5*(1).

Huang, X., Zou, D., Cheng, G., Chen, X., & Xie, H. (2023). Trends, research issues and applications of artificial intelligence in language education. *Educational Technology & Society*, *26*(1), 112-131.

Kerimbayev, N., Adamova, K., Shadiev, R., & Altinay, Z. (2025). Intelligent educational technologies in individual learning: a systematic literature review. *Smart Learning Environments*, *12*(1), 1.

Kimmons, R., Graham, C. R., & West, R. E. (2020). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education*, *20*(1), 176-198.

Luckin, R., & Cukurova, M. (2019). Designing educational technologies in the age of AI: A learning sciences- driven approach. *British Journal of Educational Technology*, *50*(6), 2824-2838.

Lutfiani, N., & Meria, L. (2022). Utilization of big data in educational technology research. *International Transactions on Education Technology*, *1*(1), 73-83.

Marek, M. W., Chew, C. S., & Wu, W.-c. V. (2021). Teacher experiences in converting classes to distance learning in the COVID-19 pandemic. *International Journal of Distance Education Technologies (IJDET)*, *19*(1), 89-109.

ISSN Online: 3078-3054, ISSN Print: 3078-3046
Volume No: 02 Issue No: 01 (2025)

International Conference on Innovating for a Sustainable Future: Global Challenges and Solutions
April 24-25, 2025

Morel, G. M., & Spector, J. M. (2022). *Foundations of educational technology: Integrative approaches and interdisciplinary perspectives*. Routledge.

Nadeem, M., Rafiq, M. A., & Jameel, K. (2025). The role of educational technology in academia. In *Encyclopedia of Information Science and Technology, Sixth Edition* (pp. 1-12). IGI Global.

Nazaretsky, T., Ariely, M., Cukurova, M., & Alexandron, G. (2022). Teachers' trust in AI- powered educational technology and a professional development program to improve it. *British Journal of Educational Technology*, *53*(4), 914-931.

Palacios-Hidalgo, F. J., & Huertas-Abril, C. A. (2025). Developing digital literacy in initial EFL teacher education: A study in a Spanish distance university. *Open Learning: The Journal of Open, Distance and e-Learning*, *40*(1), 50-66.

Riina, V., Yves, P., & Cabrera, M. (2020). Emerging technologies and the teaching profession. *Publications Office of the European Union: Luxembourg*.

Rosanda, V., & Starcic, A. I. (2019). Emerging educational technology and teacher education. *Образование и саморазвитие*, *14*(3), 93-106.

SAKARIYAHU, S., MAKINDE, S. O., MOHAMMED, A., ABDULLAHI, A., & AHMED, A. A. (2025). Edupreneurship, Technology, and Quality Assurance in Teacher Training: Al-Hikmah University's Practices and Outcomes. *Ilorin Journal of Education*, *45*(2), 156-175.

Sánchez-Cruzado, C., Santiago Campión, R., & Sánchez-Compaña, M. T. (2021). Teacher digital literacy: The indisputable challenge after COVID-19. *Sustainability*, *13*(4), 1858.

Sanhueza, M., Sandoval, L., Ormazabal, M., & Zúñiga, M. (2025). Effect of a teacher training program with ICT on university students' learning. *Contemporary Educational Technology*, *17*(1), ep556.

Santos, J. M., & Castro, R. D. (2021). Technological Pedagogical content knowledge (TPACK) in action: Application of learning in the classroom by pre-service teachers (PST). *Social Sciences & Humanities Open*, *3*(1), 100110.

Seufert, S., Guggemos, J., & Sailer, M. (2021). Technology-related knowledge, skills, and attitudes of pre-and in-service teachers: The current situation and emerging trends. *Computers in Human Behavior*, *115*, 106552.

Shatunova, O., Anisimova, T., Sabirova, F., & Kalimullina, O. (2019). STEAM is an innovative educational technology. *Journal of Social Studies Education Research*, *10*(2), 131-144.

Starkey, L. (2020). A review of research exploring teacher preparation for the digital age. *Cambridge Journal of Education*, *50*(1), 37-56.

Sweller, J. (2020). Cognitive load theory and educational technology. *Educational technology research and development*, *68*(1), 1-16.

Tanak, A. (2020). Designing a TPACK-based course for preparing student teachers to teach science with technological pedagogical content knowledge. *Kasetsart Journal of Social Sciences*, *41*(1), 53–59-53–59.

ISSN Online: 3078-3054, ISSN Print: 3078-3046
Volume No: 02 Issue No: 01 (2025)

International Conference on Innovating for a Sustainable Future: Global Challenges and Solutions
April 24-25, 2025

Teräs, M., Suoranta, J., Teräs, H., & Curcher, M. (2020). Post-Covid-19 education and education technology 'solutionism': A seller's market. *Postdigital Science and Education*, *2*(3), 863-878.

Tondeur, J., Scherer, R., Siddiq, F., & Baran, E. (2020). Enhancing pre-service teachers' technological pedagogical content knowledge (TPACK): A mixed-method study. *Educational technology research and development*, *68*(1), 319-343.

Tuma, F. (2021). The use of educational technology for interactive teaching in lectures. *Annals of Medicine and Surgery*, *62*, 231-235.

Tusquellas, N., López-Villanueva, D., Palau, R., & Santiago, R. (2025). Educational Conceptual Model Design Research Methodology. *UTE Teaching & Technology (Universitas Tarraconensis)*(2), e4103-e4103.

Whalen, J. (2020). Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. *Journal of technology and teacher education*, *28*(2), 189-199.

Yan, L., Sha, L., Zhao, L., Li, Y., Martinez- Maldonado, R., Chen, G., Li, X., Jin, Y., & Gašević, D. (2024). Practical and ethical challenges of large language models in education: A systematic scoping review. *British Journal of Educational Technology*, *55*(1), 90-112.

Zhang, W. (2022). The role of technology-based education and teacher professional development in English as a foreign language classes. *Frontiers in Psychology*, *13*, 910315.

Zubaidi, A. M., & Velusamy, S. (2025). The Necessity of Educational Technology in Teaching Methods: Why Educational Technology in Teaching Is Important? In *Encyclopedia of Information Science and Technology, Sixth Edition* (pp. 1-12). IGI Global.