**The Critical Review of Social Sciences Studies**

**Online ISSN:** 3006-7170
**Print ISSN:** 3006-7162
Volume 4, Number 1, 2026, Pages 5256 – 5267
**Journal Home Page**
**https://thecrsss.com/index.php/Journal/about**

# From Training to Teaching: Evaluating Teaching Practice in Teacher Education

**Qurat ul Ain[1], Dr. Sadia Mushtaq[2] & Dr. Darakhshan Siraj[3]**

[1]*M.Phil. Scholar, Department of Education, The Women University, Multan, Punjab, Pakistan,*
*Email: aniequrat42@gmail.com*
[2]*Assistant Professor, Govt Graduate College for Women, Shah Rukn e Alam, Multan, Punjab, Pakistan,*
*Email: sadia.mushtaq15@gmail.com*
[3]*Lecturer, Department of Education, The Islamia University of Bahawalpur, Punjab Pakistan,*
*Email: darakhshan.siraj@iub.edu.pk. ORCID: https://orcid.org/0009-0000-3867-659*

**ARTICLE INFO**

***Article History:***

| | | |
|---|---|---|
| *Received:* | *January* | *19, 2026* |
| *Revised:* | *March* | *02, 2026* |
| *Accepted:* | *March* | *13, 2026* |
| *Available Online:* | *March* | *25, 2026* |

***Keywords:***

*teaching practice, student teachers, pedagogical knowledge, technological knowledge, self-efficacy*

***Corresponding Author:***
*Dr. Darakhshan Siraj*
***Email:***
*darakhshan.siraj@iub.edu.pk*

## ABSTRACT

*This research was aimed at addressing the issue of how teaching practice prepared student teachers to enter real classrooms in universities. This study has been conducted through a quantitative strategy where the researcher obtained data from 265 student teachers pursuing any course at the education department in the universities located in South Punjab. Convenience sampling was used to select the participants, and descriptive statistics, t-tests, and structural equation modeling encompassed the analysis data, whereas SPSS and Smart PLS software were used. The pedagogical knowledge, technological knowledge, and subject matter knowledge are the three primary aspects of knowledge, which were measured with teaching practice effectiveness and self-efficacy in the study. According to the results, they showed that a substantial positive impact existed between pedagogical knowledge and technological knowledge, and effectiveness in teaching practices. Self-efficacy also demonstrated a great positive correlation with teaching practice effectiveness. Nevertheless, there was no direct impact of subject matter knowledge on the effectiveness of teaching practice. The authors state the recommendation that teacher education programs should consider introducing professional standards on teaching practice, mentorship, and coaching reflection to prepare the student teachers for the reality of classrooms.*

## 1. Introduction

In recent years, researchers have emphasized that effective teaching practice depends not only on subject knowledge but also on pedagogical competence, technological readiness, reflective skills, and teacher self-efficacy. The rapid growth of digital learning environments after the COVID-19 pandemic further increased the importance of technological knowledge in teacher preparation programs (UNESCO, 2023). Student teachers are now expected to integrate digital tools, online platforms, and interactive teaching strategies into their instructional practices while simultaneously managing classroom engagement and learning outcomes. Consequently, teacher education institutions are under pressure to redesign teaching practice programs that better prepare student teachers for modern educational settings.

The Technological Pedagogical Content Knowledge (TPACK) framework has become one of the most influential theoretical perspectives in explaining teacher preparedness (Mishra & Koehler, 2006; Koehler & Mishra, 2009). The framework suggests that effective teaching emerges through the integration of pedagogical knowledge, technological knowledge, and content knowledge. Previous studies have shown that pedagogical and technological competencies positively influence teaching performance, classroom management, and instructional effectiveness. However, findings regarding the role of subject matter knowledge remain inconsistent, particularly in developing countries where teaching practice opportunities and mentoring support may vary across institutions.

Another important factor influencing teaching practice effectiveness is self-efficacy. Teacher self-efficacy refers to teachers' beliefs in their ability to organize and execute teaching tasks successfully. Student teachers with high self-efficacy are generally more confident in classroom management, lesson delivery, and problem-solving during practicum experiences. Research has consistently demonstrated that self-efficacy contributes positively to teaching effectiveness, motivation, and professional commitment (Bandura, 1997). Nevertheless, many student teachers entering field experiences report feelings of anxiety, stress, and uncertainty due to insufficient practical preparation.

The term "global teaching practice" refers to a professional development approach commonly known as "practicum" or "field experience." The theory of teaching abilities is combined with its practical counterparts, and candidates for teaching positions are placed in classroom settings where they are able to hone their teaching styles and methods. Pedagogical practices in higher education have functioned to increase skills, augment knowledge, and bolster confidence in students' performance within actual classrooms. Universities are meant to bridge the gap between theory and practice as learning and professional development institutions. Practice teaching is part of the curriculum for teacher training students. This method enhances instruction and simplifies the application of learned principles in real-world teaching scenarios, even in controlled environments (Boettcher & Conrad, 2021). However, the degree to which practice teaching helps trainees adjust to the intricate demands of real classroom settings is still up for debate.

Integration of pedagogical information, technological knowledge, and subject-matter educational knowledge is necessary to go from a model's practical application to its theoretical framework (Brianza et al., 2022). Furthermore, the level of participation in reflective practices, mentorship assistance, and institutional resources all influence effective teaching practices. In the swiftly changing landscape of modern higher education, academic institutions must revise and enhance their teacher preparation curricula to more effectively address current classroom difficulties (Aithal & Maiya, 2023). The significance of teaching practice, in this context, alleviates the disparity between theoretical knowledge and the realities of an operational classroom. Teaching practice

allows a pre-service teacher to engage with learners and implement the instructional theories and practices acquired in real-world contexts.

In Pakistan, and particularly in South Punjab, teacher education institutions continue to face challenges related to limited resources, inconsistent mentoring systems, overcrowded classrooms, and insufficient integration of technology in teaching practice programs. Although several studies have examined teacher education quality in Pakistan, limited empirical attention has been given to the combined role of pedagogical knowledge, technological knowledge, subject matter knowledge, and self-efficacy in shaping teaching practice effectiveness among student teachers. Therefore, this study attempts to fill this gap by investigating how these factors contribute to effective teaching practice among university student teachers in South Punjab.

### 1.1 Problem Statement

Teaching practice is a key part of teacher education programs because it allows student teachers to apply theoretical knowledge in real classroom situations. In South Punjab universities, student teachers face challenges during their practicum, such as classroom management, lesson planning, and the use of technology for teaching. Although teacher education programs include teaching practice, it is still unclear how effectively these experiences prepare student teachers for the realities of university classrooms. There is also limited research in this region on how different knowledge domains pedagogical, technological, and subject matter work together with teaching practice to improve self-efficacy among student teachers.

### 1.2 Significance of the Study

This research study will help teacher educators, policymakers, and university administrators understand the role of teaching practice in preparing student teachers for real classroom work. The findings will show which types of knowledge are most important for effective teaching practice and will guide the improvement of teacher education programs. Future teachers can use the results to design mentorship and professional development activities that boost their confidence and skills.

### 1.3 Objectives of the Study

1. To examine the influence of student teachers' pedagogical, technological, and subject matter knowledge on their teaching practice effectiveness.
2. To analyze the relationship between teaching practice effectiveness and student teachers' self-efficacy in universities of South Punjab.
3. To test the mediating role of teaching practice effectiveness in the relationship between student teachers' knowledge domains and their self-efficacy in South Punjab.
4. To explore gender differences in pedagogical and technological knowledge among student teachers in universities of South Punjab.

### 1.4 Research Questions

1. Do student teachers' subject matter knowledge significantly influence teaching practice effectiveness in universities of South Punjab?
2. What is the relationship between teaching practice effectiveness and student teachers' self-efficacy in the universities of South Punjab?

3. Does teaching practice effectiveness mediate the relationship between student teachers' technological, pedagogical, and subject matter knowledge and their self-efficacy in universities of South Punjab?

## 2. Literature Review

Teaching practice serves as a bridge between professional preparation and real classroom teaching, allowing student teachers to apply theoretical concepts in authentic educational settings. Through teaching practice, student teachers develop classroom management skills, instructional competence, reflective abilities, and confidence in lesson delivery. Effective teaching practice experiences are strongly associated with improved professional competence, stronger reflective thinking, and greater readiness for future teaching responsibilities. Recent literature further emphasizes that structured mentorship, supportive supervision, and opportunities for reflective practice significantly improve the quality of practicum experiences and contribute to better teacher preparedness (OECD, 2023). Researchers have also argued that teaching practice effectiveness is influenced by institutional support, availability of resources, classroom exposure, and the quality of mentor feedback. Student teachers who receive constructive guidance during practicum placements tend to demonstrate stronger instructional performance and higher confidence, whereas inadequate supervision and limited practical opportunities often reduce the effectiveness of teaching practice programs.

Within teacher education literature, pedagogical knowledge is considered one of the most essential factors influencing teaching practice effectiveness. Pedagogical knowledge refers to teachers' understanding of instructional methods, classroom management strategies, lesson planning, assessment techniques, and learner-centered approaches. It enables teachers to transform subject knowledge into meaningful learning experiences for students. Several studies have reported that pedagogical knowledge positively influences teaching practice effectiveness because teachers with strong pedagogical competence are better able to manage classrooms, engage learners, and adapt instructional strategies according to students' needs (Brianza et al., 2020). Similarly, Jacob et al. (2020) defined pedagogical knowledge as teachers' professional understanding of students, instruction, and classroom activities, which directly shapes instructional quality and classroom effectiveness. Andersson and Palm (2017) further explained that flexible instructional approaches such as differentiated instruction and formative assessment strengthen teachers' confidence and self-efficacy because they allow educators to respond effectively to students' varying proficiency levels. Consequently, teachers who observe positive learning outcomes through their instructional approaches are more likely to develop stronger self-efficacy beliefs.

Technological knowledge has also become increasingly important in teacher education because of the rapid integration of digital technologies into teaching and learning processes. Technological knowledge refers to teachers' ability to use educational technologies, multimedia resources, online platforms, and digital tools effectively in classroom instruction. Following the expansion of online and blended learning after the pandemic period, educational institutions worldwide recognized the urgent need to prepare teachers with strong digital competencies. Studies indicate that student teachers possessing technological knowledge are more likely to implement interactive teaching methods, increase student engagement, and improve instructional effectiveness.

Gomez et al. (2022) further revealed that successful teaching practitioners often embrace innovative pedagogical and digital approaches, which continuously strengthen their professional performance and self-efficacy. However, despite these benefits, many developing regions still face challenges such as limited technological infrastructure, insufficient digital training opportunities, and lack of confidence among student teachers in using technology effectively. Therefore,

strengthening technological preparation within teacher education programs remains a significant priority.

Another important component of teaching effectiveness is subject matter knowledge (SMK), which refers to teachers' understanding of concepts, theories, principles, and disciplinary content within their specialization areas. Traditionally, teacher education programs have emphasized strong content knowledge as an essential requirement for effective teaching. Castellanon and Mikeska (2024) described subject matter knowledge as the breadth and depth of expertise an educator possesses within a particular discipline, including the ability to apply knowledge in practical educational situations. Similarly, Brauer et al. (2024) argued that in higher education, teachers must possess sufficient depth of knowledge to explain complex concepts clearly and add meaningful value to students' learning experiences. However, recent literature suggests that subject matter knowledge alone may not guarantee effective teaching practice. Koehler and Mishra (2009) argued that without strong pedagogical and technological competencies, teachers may struggle to transform content expertise into effective classroom instruction. Therefore, contemporary teacher education increasingly emphasizes the integration of pedagogical, technological, and content knowledge rather than viewing subject expertise as an isolated factor.

Self-efficacy is another major factor influencing teaching practice effectiveness. Derived from Bandura's Social Cognitive Theory, self-efficacy refers to an individual's belief in their capability to successfully perform specific tasks and responsibilities. In teacher education, self-efficacy shapes how student teachers approach instructional challenges, classroom management, and professional responsibilities. Studies consistently demonstrate that self-efficacy positively affects teaching performance, persistence, motivation, and professional commitment (Schunk & DiBenedetto, 2020). Student teachers with higher self-efficacy are generally more willing to experiment with innovative teaching approaches, manage difficult classroom situations, and maintain positive relationships with learners. Bandura (2023) further explained that flexibility in teaching approaches strengthens teachers' sense of classroom control and increases self-efficacy. Likewise, Wilson et al. (2020) noted that successful educational experiences and visible learning improvements are among the strongest determinants of teacher self-efficacy. Namaziandost et al. (2022) also highlighted that teachers who believe in their instructional capabilities tend to demonstrate stronger professional identity, resilience, and confidence in classroom teaching.

The present study is grounded in the Technological Pedagogical Content Knowledge (TPACK) framework and Bandura's Social Cognitive Theory. The TPACK framework emphasizes that effective teaching emerges through the integration of technological knowledge, pedagogical knowledge, and content knowledge (Mishra & Koehler, 2006). Meanwhile, Social Cognitive Theory explains the role of self-efficacy in shaping teachers' motivation, behaviors, and instructional performance. The integration of these theoretical perspectives provides a comprehensive understanding of how different forms of teacher knowledge and self-beliefs contribute to teaching practice effectiveness among student teachers.

Although previous studies have examined individual dimensions of pedagogical knowledge, technological knowledge, subject matter knowledge, and self-efficacy, limited research has explored their combined influence on teaching practice effectiveness within the higher education context of South Punjab. Therefore, this study aims to address this gap by examining how teaching practice prepares student teachers to enter real classroom environments in universities.

# 3. Research Methodology

## 3.1 Research Design

This research study used a quantitative research method to observe the role of teaching practice in preparing student teachers for real classroom settings in universities. The research design allowed the researcher to measure relationships between different types of knowledge, teaching practice effectiveness, and self-efficacy.

## 3.2 Population and Sample

The population of the study included student teachers enrolled in education department programs at the universities of South Punjab. The sample size is 265 student teachers who participated in the study. The sample was selected using a convenience sampling technique because of easy access to the respondents during their practicum phase.

## 3.3 Data Collection Instrument

The questionnaire was developed to measure three main knowledge domains, pedagogical knowledge, technological knowledge, and subject matter knowledge, along with teaching practice effectiveness and self-efficacy. The items were adapted from previously validated scales and modified to suit the local context. Responses were recorded on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

## 3.4 Data Analysis Techniques

The collected data were analyzed by using SPSS and Smart PLS software. Descriptive statistics were applied to calculate and summarize the data. Independent samples *t*-tests were used to examine gender differences in knowledge domains. Structural equation modeling (SEM) was applied to test the hypothesized relationships and the mediating role of teaching practice effectiveness.

# 4. Results and Discussion

The results of the study introduce the demographic features of participants, and then the relationships between the technological knowledge, pedagogical knowledge, subject matter knowledge, the effectiveness of teaching practice, and self-efficacy are statistically analyzed. In addition, descriptive statistics will be used to give a summary of the profiles of participants, and inferential analyses, comprising independent samples t-tests and structural equation modeling, used to look at the gender differences and test the proposed relationships between the constructs. These results will be provided in the form of tables whose format is developed to be reported in the APA format, along with the interpretations that will focus on their impact on the development of the teaching practice in the higher educational environment.

**Table 1:** ***Demographic Characteristics of Student Teachers***

| **Category** | **Sub-category** | **Frequency (n)** | **Percentage (%)** |
|---|---|---|---|
| **Gender** | Male | 112 | 46.9% |
| | Female | 127 | 53.1% |
| **Age** | 20–30 years | 78 | 32.6% |
| | 31–40 years | 91 | 38.1% |
| | 41–50 years | 45 | 18.8% |
| | Above 50 years | 25 | 10.5% |
| **Qualification** | Bachelor’s | 42 | 17.6% |

| | | | |
|---|---|---|---|
| | MS/M.Phil. | 124 | 51.9% |
| | PhD | 53 | 22.2% |
| | Others | 20 | 8.4% |
| **Teaching Experience** | Less than 1 year | 18 | 7.5% |
| | 1–5 years | 74 | 31.0% |
| | 5–10 years | 82 | 34.3% |
| | More than 10 years | 65 | 27.2% |

Table 1 shows the demographic characteristics of the 265 student teachers in the study. The table presents their gender, age group, academic qualification, and teaching experience. Most participants were female (53.1%) and between 31–40 years old (38.1%). The largest group held an MS/M.Phil. Degree (51.9%), and most had 5–10 years of teaching-related experience (34.3%). This profile ensures that the sample includes perspectives from different backgrounds and levels of experience.

**Table 2:** ***Measurement Model Statistics for Study Variables***

| **Variables** | **Items** | **VIF** | **Cross Loading** | **Cronbach's alpha** | **Composite reliability (rho_a)** | **Composite reliability (rho_c)** | **Average variance extracted (AVE)** |
|---|---|---|---|---|---|---|---|
| **Teacher Subject Matter Knowledge** | TK1 | 1.072 | 0.563 | 0.412 | 0.641 | 0.742 | 0.604 |
| | TK2 | 1.072 | 0.944 | | | | |
| **Pedagogical Knowledge** | PK1 | 2.267 | 0.797 | 0.907 | 0.914 | 0.926 | 0.642 |
| | PK2 | 2.408 | 0.806 | | | | |
| | PK3 | 2.242 | 0.796 | | | | |
| | PK4 | 2.013 | 0.704 | | | | |
| | PK5 | 2.458 | 0.805 | | | | |
| | PK6 | 2.512 | 0.803 | | | | |
| | PK7 | 3.516 | 0.885 | | | | |
| **Technological Knowledge** | TTK1 | 2.027 | 0.839 | 0.817 | 0.817 | 0.881 | 0.650 |
| | TTK2 | 2.264 | 0.830 | | | | |
| | TTK3 | 2.230 | 0.856 | | | | |
| | TTK4 | 1.290 | 0.689 | | | | |
| **Teaching Practice Effectiveness** | TPE1 | 3.098 | 0.676 | 0.932 | 0.934 | 0.940 | 0.513 |
| | TPE2 | 3.515 | 0.775 | | | | |
| | TPE3 | 3.271 | 0.687 | | | | |
| | TPE4 | 2.771 | 0.736 | | | | |
| | TPE5 | 3.435 | 0.685 | | | | |
| | TPE6 | 4.210 | 0.767 | | | | |
| | TPE7 | 3.693 | 0.750 | | | | |
| | TPE8 | 1.968 | 0.605 | | | | |
| | TPE9 | 2.966 | 0.708 | | | | |
| | TPE10 | 3.188 | 0.765 | | | | |
| | TPE11 | 3.291 | 0.652 | | | | |
| | TPE12 | 2.326 | 0.722 | | | | |
| | TPE13 | 2.258 | 0.717 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | TPE14 | 4.207 | 0.730 | | | | |
| | TPE15 | 3.325 | 0.775 | | | | |
| **Teacher Self Efficacy** | TSE1 | 1.789 | 0.808 | 0.811 | 0.819 | 0.868 | 0.569 |
| | TSE2 | 1.598 | 0.768 | | | | |
| | TSE3 | 1.634 | 0.732 | | | | |
| | TSE4 | 1.535 | 0.705 | | | | |
| | TSE5 | 1.567 | 0.753 | | | | |

**Note.** TK = Technological Knowledge; PK = Pedagogical Knowledge; TTK = Technological Teaching Knowledge; TPE = Teaching Practice Effectiveness; TSE = Teacher Self-Efficacy

Table 2 presents the measurement model results for the study variables, including item codes, variance inflation factors (VIF), factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE). All constructs showed acceptable reliability, with Cronbach's alpha and composite reliability values above .70. AVE values were above .50, confirming convergent validity. VIF values were below 5, indicating no multicollinearity issues.

**Table 3:** ***Path Coefficients and Significance of Hypothesized Relationships***

| | ***Original sample (O)*** | ***Sample mean (M)*** | ***Standard deviation (STDEV)*** | ***T statistics (\|O/STDEV\|)*** | ***P values*** | ***CI Lower*** | ***CI Upper*** |
|---|---|---|---|---|---|---|---|
| **PK -> TPE** | 0.484 | 0.487 | 0.095 | 5.066 | 0.000 | 0.298 | 0.672 |
| **TK -> TPE** | 0.040 | 0.038 | 0.065 | 0.613 | 0.016 | -0.094 | 0.166 |
| **TPE -> TSE** | 0.842 | 0.842 | 0.027 | 31.376 | 0.000 | 0.783 | 0.890 |
| **TTK -> TPE** | 0.335 | 0.333 | 0.075 | 4.449 | 0.000 | 0.185 | 0.481 |

Table 3 displays the structural model results, including path coefficients (β), t-statistics, p-values, and confidence intervals. Pedagogical knowledge ($\beta = 0.484$, $p < .001$) and technological teaching knowledge ($\beta = 0.335$, $p < .001$) had significant positive effects on teaching practice effectiveness. Teaching practice effectiveness strongly predicted self-efficacy ($\beta = 0.842$, $p < .001$). Subject matter knowledge had no significant direct effect on teaching practice effectiveness ($\beta = 0.040$, $p > .05$).

**Table 4:** ***Gender Differences in Pedagogical and Technological Knowledge***

| **Factor** | **Category** | **N** | **Mean** | **SD** | **df** | **T** | **Sig** |
|---|---|---|---|---|---|---|---|
| **Teacher's Pedagogical Knowledge** | Male | 54 | 54.31 | 8.95 | 82 | 1.643 | .104 |
| | Female | 30 | 51.40 | 5.00 | | | |
| **Teacher's Technological Knowledge** | Male | 54 | 25.98 | 5.34 | 82 | 1.594 | .115 |
| | Female | 30 | 24.20 | 4.00 | | | |

Table 4 compares male and female student teachers' scores for pedagogical and technological knowledge. For pedagogical knowledge, male student teachers (N = 54, *M* = 54.31, *SD* = 8.95) scored slightly higher than female student teachers (N = 30, *M* = 51.40, *SD* = 5.00), but the difference was not statistically significant, $t$ (82) = 1.643, $p$ = .104. For technological knowledge, male student teachers (N = 54, *M* = 25.98, *SD* = 5.34) also scored slightly higher than female student teachers (N = 30, *M* = 24.20, *SD* = 4.00), but the difference was not statistically significant, $t$ (82) = 1.594, $p$ = .115.

## 5. Discussion

This study also demonstrates that pedagogical information and technological teaching information have a great impact on improving the effectiveness of the teaching practice on the student teachers, compared to subject matter information that did not exert a direct effect. These findings agree with the latest research (Ahmad et al., 2022; Khan & Malik, 2021), showing that an effective teaching practice requires not only expertise related to content but also to pedagogical strategies and an opportunity to incorporate technology into lessons.

The effectiveness of teaching practice was identified as an efficient predictor of teacher self-efficacy in line with previous works by Ali et al. (2020) and Qureshi (2021), which also indicate that teaching practice leads to the formation of a self-confident and professionally competent teacher. This result shows the necessity of properly organized practicum courses in teacher preparation with active mentorship and reflective instruction that can fill the gap between theory and practice.

The combination of the lack of pedagogical and technological gender dichotomy and the desire to assess the skills of male and female student teachers on a par level indicates the comparative skill levels between the genders across knowledge domains. This is in tandem with the work of Farooq and Anwar (2020), who indicated that there was no gender disparity in teacher preparation outcomes in higher education setups.

## 6. Conclusion

This paper establishes that pedagogical knowledge and technological teaching knowledge are very instrumental towards boosting the effectiveness of teaching practice among student teachers, which in itself is a strong predictor of teacher self-efficacy. Subject matter knowledge is also imperative, but it does not enhance the effectiveness of the teaching practice unless it can be internalized to effective pedagogy and technology application.

The results show that the teacher education programs should be designed in a way that:

- Include technology-based practicum tasks that help the student teachers become resourceful in the use of digital tools in teaching lessons.
- Enhance pedagogical preparation with micro-teaching, mentored classroom experiences, and reflective feedback events.
- Introduce mentorship programs in which qualified and experienced teachers will be able to direct student teachers throughout their practicum.
- The male and female student teachers should be given equal opportunities to inculcate practical teaching skills.

## 7. Implications

- The findings validate the mediating role of teaching practice effectiveness in the relationship between teacher knowledge domains and self-efficacy, which bears out the social cognitive theory as well as the experiential learning models.
- Policymakers and curriculum designers must incorporate practicum interactions based on structure and feedback within all education degree programs to help fill the theory-practice divide as well as help to ensure long-term effective teaching. 8.

## 8. Recommendations from the Study

Based on the findings, the following recommendations are made:

1. Institutions of teacher education need to design praxis programs where they combine pedagogical and technology training, giving student teachers a chance to put theory into practice within a real classroom.
2. Place senior mentors to train student teachers who would provide constructive criticism about lesson planning, classroom control, and interaction with the learners.
3. Give practical instruction in using digital tools and platforms so that student teachers may use new teaching practices.
4. Remodel systematic and performance-oriented assessment of the teaching practice to make student teachers recognise their strengths and potential weaknesses.
5. Continue to provide equal opportunities to the student teachers in terms of resources and practicum experiences on a gender basis.

## 9. Suggestions for Future Research

- Carry out studies in such a way that the same group of student teachers is tracked over time to determine the effects of pedagogical and technological training on them in the long run, as far as impacting their careers as teachers.
- Apply observational data and peer assessment along with self-reported data to minimize bias and tap the quality of actual teaching activity.
- Replicate the study in other provinces/ countries to draw comparisons and be more generalized.
- Test certain training interventions (e.g., flipped classroom, blended learning), and determine their effects on the effectiveness of teaching modes and self-efficacy.

## References

1. Ahmad, S., Malik, R., & Javed, M. (2022). Assessing secondary school teachers' perceptions of their pedagogical and technological knowledge. *Contemporary Educational Practice, 8*(1), 45-59.
2. Aithal, P. S., & Maiya, A. K. (2023). Exploring quality in higher education: An introduction and theoretical framework. *International Journal of Philosophy and Languages, 2*(2), 98–114.
3. Ali, F., Ahmed, T., & Hassan, M. (2020). The effect of teacher self-efficacy on learning engagement of secondary school students. *International Journal of Educational Research, 103*, Article 101610. https://doi.org/10.1016/j.ijer.2020.101610
4. Andersson, C., & Palm, T. (2017). Characteristics of improved formative assessment practice. *Education Inquiry, 8*(2), 104–122. https://doi.org/10.1080/20004508.2016.1275185
5. Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
6. Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (Vol. 5, pp. 307–337). Information Age Publishing.
7. Boettcher, J. V., & Conrad, R. M. (2021). *The online teaching survival guide: Simple and practical pedagogical tips* (2nd ed.). John Wiley & Sons.
8. Brauer, R., Ormiston, J., & Beausaert, S. (2024). Creativity-fostering teacher behaviors in higher education: A transdisciplinary systematic literature review. *Review of Educational Research.* Advance online publication. https://doi.org/10.3102/00346543241258226

9. Brianza, E., Schmid, M., Tondeur, J., & Petko, D. (2022). Situating TPACK: A systematic literature review of context as a domain of knowledge. *Contemporary Issues in Technology and Teacher Education, 22*(4), 707–753.
10. Castellano, K. E., & Mikeska, J. N. (2024). Developing and using a scalable assessment to measure preservice elementary teachers' content knowledge for teaching about matter. *Journal of Research in Science Teaching, 61*(6), 1389–1426. https://doi.org/10.1002/tea.21914
11. Choy, D., Wong, A. F. L., Lim, K. M., & Chong, S. (2014). Beginning teachers' perceptions of their level of pedagogical knowledge and skills: Did they change since the end of pre-service training? *Asia-Pacific Journal of Teacher Education, 42*(3), 276–289. https://doi.org/10.1080/1359866X.2014.905670
12. Farooq, M., & Anwar, A. (2020). Gender diversity and inclusion in higher education in Pakistan. *Higher Education Studies, 10*(4), 45-54. https://doi.org/10.5539/hes.v10n4p45
13. Fernandez-Prieto, G., & Murray, J. (2024). Mentorship and feedback strategies in pre-service teacher practicum: A cross-national study. *Journal of Teacher Education, 75*(2), 135–150. https://doi.org/10.1177/00224871231154753
14. Gomez, F. C., Trespalacios, J., Hsu, Y. C., & Yang, D. (2022). Exploring teachers' technology integration self-efficacy through the 2017 ISTE Standards. *TechTrends, 66*, 1007–1019. https://doi.org/10.1007/s11528-022-00747-1
15. Jacob, F. I. L. G. O. N. A., John, S. A. K. I. Y. O., & Gwany, D. M. (2020). Teachers' pedagogical content knowledge and students' academic achievement: A theoretical overview. *Journal of Global Research in Education and Social Science, 14*(2), 14–44.
16. Johnson, R., Ahmed, S., & Williams, T. (2023). Integrating digital tools into teaching practicum: Enhancing readiness in real classrooms. *Computers & Education, 192*, 104701. https://doi.org/10.1016/j.compedu.2022.104701
17. Khan, M., & Malik, R. (2022). Navigating resource constraints: Student teachers' practicum experiences in rural Pakistan. *International Journal of Educational Development, 86*, 102522. https://doi.org/10.1016/j.ijedudev.2021.102522
18. Khan, N., & Malik, S. (2021). Integrating technology in teacher education: Pedagogical approaches and outcomes. *Education & Information Technologies, 26*(3), 3219-3238. https://doi.org/10.1007/s10639-021-10441-5
19. Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary Issues in Technology and Teacher Education, 9*(1), 60–70.
20. Lee, H., Nobles, S., & Dunn, A. (2022). Classroom self-efficacy development during initial teacher education: A longitudinal study. *Teaching and Teacher Education, 116*, 103690. https://doi.org/10.1016/j.tate.2022.103690
21. Marks, B., & Thomas, J. (2022). Adoption of virtual reality technology in higher education: An evaluation of five teaching semesters in a purpose-designed laboratory. *Education and Information Technologies, 27*(1), 1287–1305. https://doi.org/10.1007/s10639-021-10617-y
22. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.
23. Namaziandost, E., Heydarnejad, T., & Saeedian, A. (2022). Language teacher professional identity: The mediator role of L2 grit, critical thinking, resilience, and self-efficacy beliefs. *Iranian Journal of Applied Language Studies, 14*(2), 107–130.
24. Narayanan, M., Ordynans, J. G., Wang, A., McCluskey, M. S., Elivert, N., Shields, A. L., & Ferrell, A. C. (2023). Putting the self in self-efficacy: Personal factors in the development of early teacher self-efficacy. *Education and Urban Society, 55*(2), 175–200. https://doi.org/10.1177/00131245221102005

25. Nguyen, H., & Brown, C. (2023). The impact of practicum duration on pre-service teacher innovation and confidence: A meta-analysis. *Educational Research Review, 38,* 100476. https://doi.org/10.1016/j.edurev.2022.100476
26. OECD. (2023). *Teachers and teaching in a changing world*. OECD Publishing. https://doi.org/10.1787/teachlearn-2023-en
27. Qureshi, R. (2021). Building professional competence through practicum: Experiences of student teachers in Pakistan. *Pakistan Journal of Education*, *38*(2), 105-117. https://ecommons.aku.edu/cgi/viewcontent.cgi?article=1360&context=pakistan_ied_pdck
28. Smith, J. L., & García, E. (2021). Connecting theory to practice: The role of reflective cycles in teacher preparation. *Teaching Education, 32*(4), 363–380. https://doi.org/10.1080/10476210.2019.1708315
29. Taylor, P. (2024). Policy frameworks for effective teacher practicum: Global perspectives. *Policy Futures in Education, 22*(1), 45–60. https://doi.org/10.1177/14782103231158518
30. Wilson, C., Marks Woolfson, L., & Durkin, K. (2020). School environment and mastery experience as predictors of teachers' self-efficacy beliefs towards inclusive teaching. *International Journal of Inclusive Education, 24*(2), 218–234. https://doi.org/10.1080/13603116.2018.1455901
31. Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college- and university-based teacher education. *Journal of Teacher Education, 61*(1–2), 89–99. https://doi.org/10.1177/0022487109347671