

Meta-Analysis Study: Expectations of 21st Century Teaching from Pre-Service Teacher Education Programs

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Abstract

This study aims to investigate the expectations of 21st-century teaching from pre-service teacher education programs and to analyze the contemporary status of pre-service teacher education programs in developing 21st-century teaching skills among prospective teachers. The meta-analysis method was used to analyze previously conducted studies in the context of 21st-century teaching. The findings reveal that, to some extent, pre-service teacher education programs contribute to developing the 21st-century teaching skills by imparting theoretical knowledge, but there is a gap in the application of theory and pedagogical practices. Consequently, there is a pressing need to reconsider the pre-service teacher education programs to inculcate the essential teaching skills for 21st-century, such as collaborative learning, reflective thinking, social and emotional competencies, adaptive skills, communication skills, creativity and entrepreneurship skills, critical thinking, problem-solving skills, and ICT skills for teaching and social networking.

Keywords: *21st century teaching skills, pre-service teacher education programs, prospective teachers, theoretical knowledge, pedagogical practices*

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Introduction

Skills for the 21st century encompass a range of knowledge, abilities, work habits, and character traits essential for success in contemporary society, especially in higher education and modern professions. These skills are typically divided into three main categories: learning and innovation, digital literacy, and life and career skills. They include, but are not limited to, critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, adaptability, leadership, initiative, productivity, and social skills (National Education Association, 2020).

To effectively foster these competencies, 21st-century teachers must be proficient in both working and learning skills. They need to possess the abilities and pedagogical practices necessary to support and enhance their students' skill development (Voogt et al., 2013). So, twenty-first-century teachers need to be competent in both their working and learning skills.

Fraillon (2014) stated that teachers must be able to incorporate the training of 21st-century teaching competencies into their pedagogical practices. This places higher demands on teacher training programs. The pedagogical practices of novice teachers must be aligned with their training to equip them with skills needed for the 21st-century. Hakkinen et al. (2017) claimed that teacher education is a potent catalyst for long-term change and promotes incorporating 21st-century skills in regular academic operations. According to Voogt et al. (2013), prospective teachers must be encouraged to develop 21st-century teaching competencies to ensure the effective implementation of these competencies in their future classrooms.

Further, the consistent support and integration of 21st-century skills into instructional practices are vital to ensure the development of 21st-century competencies among pre-service teachers (Urbani et al., 2017). However, it is necessary to examine the learning abilities and application of cognitive and metacognitive learning strategies during their early years of teacher education to gain a better understanding of prospective teachers as learners, how their skills develop and what kind of support they might require in developing their learning skills during pre-service teacher education. In addition to being crucial for learning and development, this is important for prospective teachers as future teachers to exemplify and foster strong self-regulated learning (SRL) abilities in their potential students as well.

Moreover, the inspiring thing about 21st-century education is its stress on globalization and internationalization. So, teacher educators must update their knowledge and skills to

incorporate 21st-century competencies among prospective teachers, as doing so will help a highly trained future generation to compete in the era of globalization. Enhancing professionalism in teaching is crucial, particularly in preparing prospective teachers for the complexities of 21st-century learning skills. It involves offering comprehensive training to prospective teachers, equipping them with the skills and knowledge necessary to meet the evolving demands of modern learning environments (Katitia, 2015). To accomplish this, teacher educators need to master a diverse set of 21st-century skills to impart teaching skills effectively among prospective teachers. These 21st-century skills include:

- i. Communication and Collaboration skills: the ability to express ideas effectively and work collaboratively. Clear communication: Articulating thoughts and ideas clearly and effectively. Collaborative skills: Working cooperatively with others.
- ii. Critical Thinking and Problem-Solving Skills: Analyzing complex problems and developing solutions.
- iii. Creativity and Innovation: Demonstrating originality and inventiveness.
- iv. Leadership and Responsibility: Guiding teams and taking accountability.
- v. Productivity and Accountability: Managing work efficiently and responsibly.
- vi. Social and Cross-Cultural Skills: Interacting effectively with diverse groups.
- vii. Adaptation to Learning Environments: Adjusting teaching methods to suit different settings (Nissim, Weissblueth, Scott, & Amar, 2016; Quieng, Lim, & Lucas, 2015).

The above-mentioned competencies are crucial for 21st-century teachers to thrive in the contemporary world. So, this study aims to delve into detailed insights about 21st-century teaching competencies and expectations from pre-service teacher education programs. Additionally, it examines the current state of pre-service teacher education programs in terms of their effectiveness in inculcating 21st-century teaching skills among prospective teachers. This study provides an understanding of how well these programs prepare aspiring teachers to meet modern education's evolving demands and challenges.

Methodology

The meta-analysis method was used to conduct this study by analyzing and aggregating the previously conducted studies in the area of 21st-century teaching skills. A systematic approach was used in the selection and analysis of the articles. Firstly, the area of interest was decided, and in the next step, the objectives of the study were formulated. The variety of online resources, i.e., Litmaps, ERIC, Google Scholar, Research Rabbit, Research Gate,

Science Direct, and JOSTR were used to explore and search the articles related to the selected study area. Most articles were directly downloaded from the websites as full-text documents, whereas few were retrieved on the request of a full-text document.

Then, the explored articles were reviewed thoroughly, and a few were excluded from the selected list because of the diverse nature of their studies. Alongside, the time duration was also decided for selecting articles, i.e., from 2010 to till date.

In the second step, keeping in view the objectives of the study, themes were generated to extract the relevant data from selected articles, and results were drawn and organized systematically. Initially, forty-seven (47) articles were selected for meta-analysis. However, after reviewing their content thoroughly, only thirty-two (32) articles were found relevant to the study's objectives, and the rest were excluded due to the diverse themes of the study. The following certain themes were generated and observed to extract the relevant data from the selected articles:

- i. collaborative learning,
- ii. reflective thinking skills and critical thinking skills,
- iii. social and emotional competencies,
- iv. adaptive skills
- v. communication skills,
- vi. creativity and entrepreneurship skills
- vii. problem-solving skills
- viii. ICT skills for teaching and social networking

Furthermore, the qualitative approach was applied for data analysis purpose. Initially, the selected articles were studied thoroughly for extracting the relevant data. A draft was prepared by writing the relevant data to related themes, and after extensive review of the draft, the data were finalized. Lastly, the extracted data on the bases of themes were organized and presented systematically. The following results (figure 1) were drawn on the bases of analysis.

Findings and Discussions

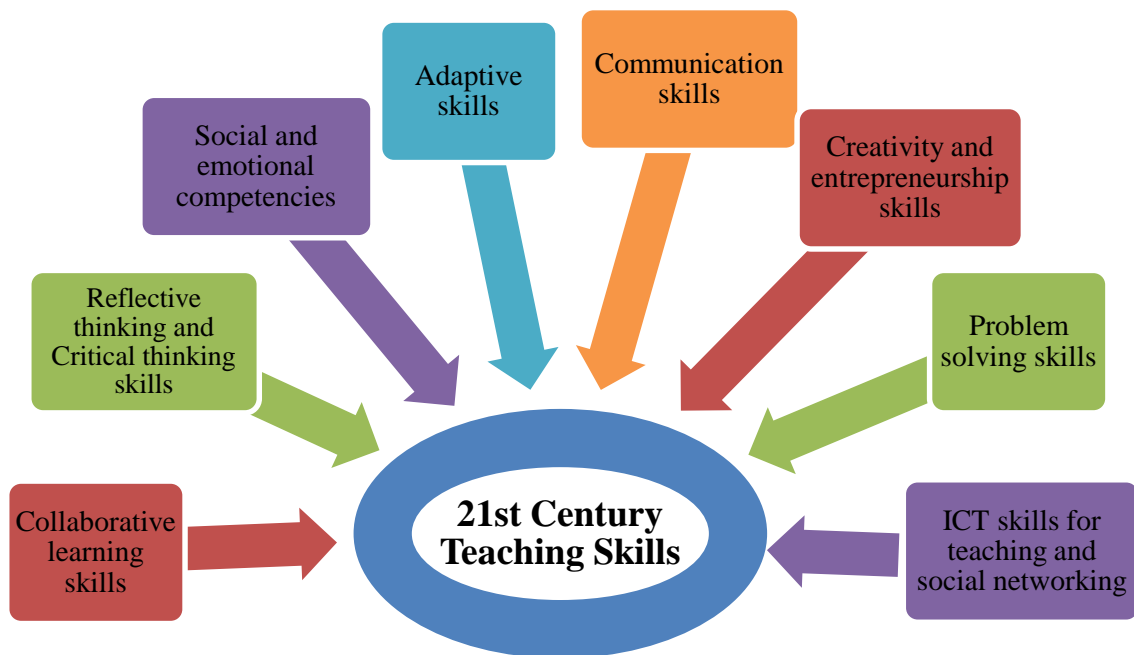


Figure 1 Essential 21st century teaching skills

Collaborative Learning Skills:

According to Gentry (2012), collaborative skills are vital for all teachers to collaborate, especially those who teach students with disabilities need to have this quality. However, it might not be very pleasant to learn that prospective teachers do not receive proper training or experience for collaborative teamwork. Collaborative learning skills are crucial for tackling the challenges and seizing the opportunities in the industrial revolution 4.0 era. Universities should, therefore, equip their prospective teachers with these skills. Studies have shown that the collaborative abilities among prospective teachers are generally good. However, practical activities can be more effective in improving and developing collaborative skills among future teachers (Malik et al., 2021).

Previous studies suggested engaging students in collaborative learning activities can improve their learning outcomes (O'Donnell & Hmelo-Silver, 2013). This improvement is evident in acquiring subject knowledge and developing teamwork abilities or collaborative learning skills, which align closely with the competencies required in contemporary, team-oriented workplaces (Gauvain, 2018). Participating in collaborative learning activities allows individuals to witness how social interactions function and observe the impact of collective work on educational goals. This method encompasses attitudes towards teamwork, such as cooperative spirit, leadership within a team, and negotiation skills (OECD, 2017).

Additionally, educational systems need to be equipped with necessary ICT (information and communication technology) tools, including both hardware and software and for curricula to be structured to foster an environment that encourages collaborative and student-centered learning, in which students can engage with and react (Boholano, 2017).

Reflective Thinking and Critical Thinking Skills:

The value of reflective thinking in the teaching profession is already well recognized, serving as a key indicator of learning and a vital component of teachers' professional growth. In Pakistan's teacher education system, there is a notable emphasis on producing a high number of graduates, yet there is insufficient attention given to nurturing reflective practitioners in this field (Aslam et al., 2021). Vidhya and Subramanian (2022) stated that to become reflective thinkers; prospective teachers need to possess the ability to self-assess by thoroughly examining all options to make informed decisions in addressing classroom challenges.

Moreover, reflective thinking can train critical thinking skills through a comprehensive exploration of scientific knowledge and developing creative thinking skills by conducting scientific studies for application in new scenarios. The ability of teachers to engage in reflective thinking during lessons also influences the development of students' critical thinking skills. These skills necessitate ongoing structured training to ensure students become skilled. The learning models that incorporate reflective thinking should be implemented in higher education and at the basic level. Such approaches guide teachers and students towards advanced levels of thinking (Nuraini et al., 2020). Meanwhile, the current state of teacher education programs is concerning, particularly regarding their effectiveness in fostering critical thinking skills among prospective teachers. It is advised that teacher educators and curriculum designers take action to improve the current status (Bibi & Akhter, 2020).

Social and Emotional Competencies:

Over the past twenty years, an increasing number of studies have highlighted the importance of teachers' social and emotional competencies in their teaching effectiveness. Despite this recognition, there needs to be more programs specifically aimed at improving these competencies within teacher education (Dung & Zsolnai, 2021). In the school context, emotional intelligence pertains to the emotional aspects of teaching, including the capacity to identify, understand, and manage students' emotions and manage interpersonal dynamics in the classroom (Polak et al., 2015).

Consequently, the skills to recognize, control, and, most importantly, comprehend emotions and social interactions are crucial. Therefore, to develop emotional competence among students, prospective teachers must first be trained in emotional intelligence to regulate their own emotions and their students.

Emotional intelligence is equally important for teacher educators and prospective teachers because of its vital role (Spilt et al., 2011). Frameworks for social-emotional competencies stress the importance of self-awareness, self-regulation, understanding of social awareness, communication skills, empathy, and making responsible decisions (MGIEP, 2020). Recent reviews have pointed out that the social-emotional competencies of teachers are not given substantial focus in teacher education programs (Reichl, 2017).

Adaptive Skills:

Adaptive teaching skills are a tailored method of instruction to cater to the diverse needs of learners or an ability that helps individuals adjust according to the demands of the environment. It takes time and a strong commitment to learn in a unique and different environment. Adaptive skills encourage active intercultural learning, which emphasizes the need for solicitous application of personalized learning methods through careful instructional planning, facilitation, and the designing of instructional strategies (Brien et al., 2019).

Literature denotes that learners need time to regulate novel social environment. However, the proactive behavior in new settings is highly valued by those who are keen to start a conversation in a new group or socialize in a new environment. Such kind of behavior is often seen in proactive and enthusiastic prospective teachers. Conversely, many prospective teachers tend to wait for others to initiate conversations. These prospective teachers often struggle with self-confidence, are concerned about offending others, and feel shy when integrating into new groups (Syah et al., 2020). According to Porfeli and Savickas (2012), career adaptability resources comprise concern, control, curiosity, and confidence to serve as self-regulatory strengths that aid teachers in the self-management of their careers and foster career optimism (McLennan et al., 2017).

Communication Skills:

The effectiveness of teaching is reliant on strong communication skills. Teachers' ability to communicate verbally and orally is crucial for efficient classroom performance, enabling them to provide instructions effectively to students (Cavanagh et al., 2019). A teacher's multifaceted communication competence, including listening, relational, written, and verbal skills, is vital

for enhancing students' understanding of educational content. A study in the context of Pakistan revealed a common trend among prospective teachers, irrespective of gender, showing a tendency not to prioritize communication skills highly (Malik et al., 2017).

Consequently, Malik et al. (2017) drew teacher education planners' attention to revising the teacher education curricula in Pakistan, aligning them with the evolving demands of the modern world. Furthermore, like any other skills, communication skills can be developed through consistent practice (Khan et al., 2017). Verbal communication skills can be achieved through classroom presentations, beginning with simpler tasks and progressing to more challenging tasks (Halimah & Sukmayadi, 2019).

Creativity and Entrepreneurship Skills:

In the 21st Century, creativity and entrepreneurship are crucial and interconnected skills for learning outcomes and career paths. These both play a significant role in young individuals' growth and social development (Edwards et al., 2015). These competencies are not independent of each other; in fact, creativity is linked with entrepreneurial skills. Entrepreneurial practices, whether in service solutions or products, are a platform for nurturing creativity (Del Campo, 2017).

On the other hand, prospective teachers are unprepared for the market challenges. They generally possess only moderate or low levels of theoretical knowledge and practical skills. This observation is measured by the results of the "Importance Performance Analysis," which indicates that the development of entrepreneurial competencies is not yet at an optimal level (Sukardi, 2023). However, there still needs to be a notable improvement in developing skills related to taking initiative and personal responsibility.

Problem Solving Skills:

Berenger (2018) reported that "problem-solving" is a valuable skill set those values well-intentioned instruction. Nevertheless, formulating instructional models specifically for problem-solving skills development presents considerable challenges. It is challenging for teachers to design appropriate instructional contexts and offer suitable types of demonstration and guidance (Schoenfeld, 2016). An analysis of pre-service teachers' written discourse revealed notable gaps in their ability to accurately express their thought processes and apply fractions related concepts (Berenger, 2018). There is a dire need to inculcate problem-solving skills among prospective teachers through education that presents real-world problems and aims to produce competent professional teachers. Likewise, teachers also acknowledge the

importance of problem-solving skills, but still, they find it challenging to teach them due to time constraints and students' varying levels of prerequisite learning skills. However, teachers and experts both agree on the significance of problem-solving skills. Teachers tend to believe that these skills are better developed through students' everyday life experiences, whereas experts suggested that engineered problems are more effective for this purpose (Aisyah et al., 2021).

ICT Skills for Teaching and Social Networking:

Van Laar et al. (2018) stated that Information and Communication Technology (ICT) skills are central to 21st-century skills. ICT is regarded as a learning objective in its own right and as a means to facilitate other 21st-century skills. It enhances learning opportunities and supports collaboration, problem-solving, and creativity (Voogt & Roblin, 2012). In the 21st Century, technology is used as a tool that influences teaching practices, contributing to the education and professional development of teachers (Hebert et al., 2021; Hu et al., 2021). Teacher education programs offer the subject "ICT in Education" to prepare prospective teachers for teaching in general pedagogy, where they are trained to become future pedagogues.

Ciolan (2014) points out that the current young generation predominantly uses ICT for social media activities, often spending considerable time unproductively on platforms like YouTube, Facebook, and Twitter. On the other hand, Cheong (2002), as cited in Zaidieh (2012) states that social networking offers easy and quick access for reviewing, updating, and editing learning materials, providing the convenience of doing so anytime and anywhere. Further, Boholano (2017) suggested that prospective teachers can utilize various applications available on social media for their projects. Smart utilization of social networking demands critical-thinking skills and the ability to assimilate and appraise real-world situations. This approach also requires authentic learning skills to ensure the validity of the information and resources' validity. Social networking platforms facilitate pre-service teachers in integrating technology into teaching and learning processes. Additionally, these platforms help them become more socially aware of their students' issues. Electronic social networking services, particularly Facebook and others like My Space have quickly gained popularity in this context.

Social network sites primarily concentrate on building online communities united by shared interests or activities (Zaidieh, 2012). Within the realm of e-learning, these sites can be utilized for communication and discussion on various topics. Boholano (2017) highlighted

that the mere presence of ICT does not inherently enhance teaching and learning. Instead, teachers must actively engage to motivate students. The effectiveness of the teaching-learning process is contingent upon the approaches and techniques employed by the teachers.

Conclusion

Teacher education programs can play a crucial role in developing the 21st-century teaching skills among prospective teachers. By integrating the 21st-century skills into the curriculum of teacher education programs can set the foundation for producing teachers who are equipped to inspire, challenge, and guide students in a rapidly evolving world. However, the current status of teacher education is alarming for responsible authorities. Prospective teachers are expected to manage and steer the learning of the younger generation effectively. Today's era requires an educational approach that develops individuals with robust thinking skills and the dynamic application of higher-order thinking processes. Teaching in the 21st century requires teachers with advanced skills to meet the needs of the modern world and the expectations of contemporary learners. The current study indicates that current teacher education programs are not completely aligned with the skills required for future teaching demands. Therefore, it is essential to reconsider pre-service teacher education programs to inculcate the 21st-century teaching skills among prospective teachers. These skills include the application of modern pedagogical approaches, collaborative learning, reflective thinking, self-reliance, social and emotional competencies, communication skills, creativity, critical thinking, problem-solving skills, and advanced digital and networking capabilities.

Recommendations

Based on the findings and conclusion, it is recommended to conduct a comprehensive review of the current curriculum of teacher education programs to identify the gaps and update the curriculum accordingly. Design continuous professional development programs for both prospective teachers (pre-service) and teacher educators (in-service) focus on developing 21st-century skills and competencies to ensure ongoing alignment with the evolving educational demands.

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