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Teaching Competencies in Relation to the Integration of 21st-Century Skills: A Review and Analysis

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ABSTRACT

This study examines the crucial role of teaching competencies in integrating 21st-century skills into educational practices, aligning with the National Education Policy (NEP) 2020. As technology and global interconnectedness reshape education, teachers must develop diverse competencies to foster creativity, critical thinking, collaboration, problem-solving, and digital literacy skills emphasized in NEP-2020. The policy advocates for experiential learning through innovative pedagogies such as blended learning, flipped classrooms, and project-based learning, ensuring students develop higher-order thinking and adaptability. NEP-2020 underscores the integration of technology in education to enhance both academic performance and self-directed learning. Digital tools, when effectively used, create engaging environments that promote interdisciplinary problem-solving. To meet evolving educational demands, continuous professional development (CPD) is vital. The policy recommends structured teacher training programs focusing on critical thinking, creativity, and technology-driven instruction to equip educators with essential skills. Cultural and contextual factors significantly influence teaching competencies. NEP-2020 highlights inclusive and equitable education, urging training programs to address socio-economic disparities, digital access challenges, and regional variations. Institutional support is crucial, requiring collaboration among schools, policymakers, and educational institutions to provide necessary resources, mentorship, and professional learning opportunities. By fostering a culture of lifelong learning, NEP-2020 envisions an adaptive and future-ready education system. Strengthening teaching competencies through structured training and technology integration ensures that students acquire the skills needed to succeed in a dynamic world. Empowering educators with 21st-century skills is essential for preparing future generations to navigate global challenges confidently and competently.

Keywords: Teaching competencies, 21st-century skills, blended learning, professional development, educational practices

Teaching competencies are essential for effective education, enabling educators to deliver content, facilitate learning, and inspire students to reach their full potential. The National Education Policy (NEP) 2020 recognizes that teachers must go beyond subject expertise and integrate 21st-century skills such as creativity, critical thinking, collaboration, problem-solving, and digital literacy into their instructional practices. This study examines the critical relationship between teaching competencies and these essential skills, offering insights into how educators can adapt to the evolving demands of modern education.

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NEP-2020 emphasizes the shift from rote learning to experiential, inquiry-based, and competency-driven education, requiring teachers to adopt innovative strategies such as blended learning, flipped classrooms, and project-based learning. These approaches foster higher-order thinking, adaptability, and self-directed learning, ensuring students are well-prepared for a rapidly changing world. However, barriers such as limited resources, insufficient teacher training, and resistance to new pedagogies hinder effective integration. Addressing these challenges requires structured professional development programs that equip teachers with technology-driven teaching methods and student-centered pedagogies.

The policy underscores the importance of continuous professional development (CPD) to ensure that teachers remain updated with technological advancements and evolving curricula. NEP-2020 calls for teacher training programs that integrate critical thinking, creativity, and digital literacy into instructional practices. Additionally, the policy highlights the need for inclusive and equitable education, advocating training programs that address socio-economic disparities, digital access issues, and regional variations in educational infrastructure.

By fostering a culture of lifelong learning, NEP-2020 envisions an education system where teachers are empowered to integrate 21st-century skills seamlessly. Strengthening teaching competencies through structured training, mentorship, and institutional support ensures that students acquire the skills necessary to navigate global challenges confidently. This study reaffirms the transformative role of teaching competencies in driving meaningful and lasting educational reform.

Review of Related Literature

This study explores hybrid pedagogies and online learning approaches focusing on blended and flipped learning in digital environments. Blended learning combines online tools with classroom instruction, while flipped learning fosters collaboration and critical thinking. Both enhance engagement, academic performance, and digital skills. Success relies on robust technology, educator training, and innovative strategies for modern education (Mushtaq M. *et al.* 2024).

(Mushtaq B. 2023) A study on engagement in blended learning and academic performance among 400 secondary students used a descriptive survey method and a self-developed questionnaire. Statistical techniques like frequency, mean, correlation, and t-tests analyzed the data. The study highlights the need for continuous innovation and collaboration in teaching to support students' evolving academic needs and future success.

Mekala and Harishree (2020) explored engineering students' capability in innovation, life, and career skills through an online survey. They recommended integrating 21st-century skills into engineering classrooms to enhance student capabilities and meet modern demands.

Sanchez (2021) examined technology integration to develop higher-order thinking skills using a survey method. The findings highlighted practical strategies for a student-centered model that successfully integrates technology to foster 21st-century skills.

Fung, Poon, and Ng (2022) studied the impact of flipped learning on fostering 21st-century skills in STEM education. Using data triangulation, observations, and focus groups, they found flipped learning effectively enhances these skills.

Cretu (2017) investigated integrating 21st-century skills in instruction courses for pre-primary and primary teachers. Using questionnaires, findings showed positive outcomes for incorporating critical skills into teacher training programs.

Abdullateef (2021) explored the impact of digital tools like Kahoot and FlipGrid on fostering 21st-century skills through a quantitative study. Results revealed these tools empower learners and enhance their skill development.

Ogegbo and Aina (2022) examined early childhood educators' perceptions of using technology to develop competencies in young children. The qualitative study showed technology tools effectively foster 21st-century competencies.

Soh, Osman, and Arsad (2012) developed the Malaysian 21st Century Skills Instrument for secondary science students. Using cross-sectional surveys, they validated its usefulness in evaluating students' skills mastery.

Sukor, Osman, and Abdullah (2010) assessed Malaysian students' 21st-century chemistry skills using a survey. Findings revealed low overall scores, with students from high socioeconomic backgrounds scoring higher.

Rayna and Striukova (2021) studied Fab labs and makerspaces' role in fostering 21st-century skills through qualitative methods. Results showed explicit, proactive entrepreneurship programs effectively nurture these skills.

Uche and Eze (2020) investigated whether teacher education fosters 21st-century skills. Using a descriptive survey, findings revealed classroom practices enhance critical thinking, creativity, and innovation skills.

Choudary *et al.* (2021) compared science teachers' and students' 21st-century skills through an online survey. Results showed students possess more skills than their teachers.

Dhakal (2023) examined the use of 21st-century skills in Nepal's teaching practices. Using mixed methods, findings revealed moderate integration of these skills in pedagogical activities.

Jamali and Krish (2021) explored online discussion forums' role in fostering skills in English for Specific Purpose courses. The case study highlighted forums as effective tools for developing critical and digital skills.

Husin *et al.* (2016) investigated project-oriented problem-based learning in STEM education. Using a quasi-experimental design, findings showed increased 21st-century skills and problem-solving abilities.

Bani-Hamid and Abdullah (2019) examined project-based learning's effect on secondary students in the UAE. The experimental study revealed significant improvement in 21st-century skills.

Rahman *et al.* (2023) studied math project-based learning's impact on primary students' 21st-century skills. Findings from a quasi-experimental design showed enhanced collaboration and active participation.

Alkhayari (2020) investigated ESL learners' preferences and teachers' integration of 21st-century skills. Using mixed methods, findings highlighted communicative tasks as vital for skill development.

Albahlal (2019) analyzed the integration of 21st-century skills in English language learning using a descriptive approach. Results emphasized the skills' essential role and provided step-by-step strategies for integration.

Thomas and Greene (2011) evaluated game design projects in high school programming classes. Using ethnography, findings revealed that video games effectively develop multiple 21st-century skills, fostering productive citizenship.

Achwarin (2009): A study on 750 secondary school teachers in Thailand revealed high teacher competence positively correlated with educational qualifications, experience, and school size.

Srivastava & Pratibha (2009): Surveying 300 teachers in U.P., the study found a significant correlation between teaching competency and teaching aptitude, with government school teachers outperforming private counterparts.

Hamdan & Li (2010): Research in Malaysia on 309 teachers showed teaching competence strongly influenced by gender, specialization, and academic performance.

Sabu (2010): Studying 631 teachers in Kerala, findings indicated no significant impact of in-service training programs, age, gender, or school type on teaching competence.

Liakopoulou (2011): A study in Greece found teacher effectiveness dependent on attitudes, personality traits, pedagogical knowledge, and content expertise.

Kulkarni (2011): Among 100 B.Ed. trained teachers in Karnataka, a strong positive relationship was observed between teaching competence and attitudes towards teaching.

Dwivedi (2012): The B.Ed. program significantly improved teaching competencies, equally benefiting male and female trainees.

Mahanta (2012): In Assam, gender and locality differences impacted teaching competence, with female and urban teachers demonstrating better outcomes.

Anbuthasan & Balakrishnan (2013): High school teachers in Tamil Nadu exhibited significant competence differences based on locality, gender, and age, favoring rural teachers.

Bala & Singh (2013): B.Ed. trainees with high aptitude showed superior competency improvements due to structured training programs.

Mustafa (2013): In Indonesia, professional competence was higher in female and more experienced teachers, emphasizing gender-specific training needs.

Ganaie & Mudasir (2014): Male secondary school teachers in Srinagar demonstrated higher teaching competence than females, highlighting a gender gap.

Shukla (2014): Teaching competence strongly correlated with professional commitment and job satisfaction among primary teachers in Lucknow.

Ugoani (2014): Nigerian teachers' competencies were linked to effective management of basic education systems.

Lal *et al.* (2015): Teacher educators with advanced qualifications exhibited more favorable attitudes and competencies.

Mohan & Narayanaswamy (2018): Private unaided school teachers in Bengaluru demonstrated higher competency levels than their aided or government peers.

Basapur (2019): Karnataka's PGT teachers displayed greater teaching competence and positive attitudes than TGT teachers, with female teachers leading in attitudes.

Rana & Shivani (2019): Rural, private, and postgraduate teachers showed higher competence levels than their counterparts, with less experienced teachers excelling in Jammu Tehsil.

Priya (2020): Among Tamil Nadu teacher education students, soft skills like communication and stress management significantly influenced teaching competency.

Vidushy (2020): Teaching competence was strongly predicted by teaching aptitude, attitudes, and sense of responsibility among 700 secondary teachers in Punjab.

Objective

1. To examine how teaching competencies facilitate the integration of 21st-century skills.

Research Question

1. How do teaching competencies facilitate the integration of 21st-century skills into educational practices?

Significance of the Study

This study is significant in the context of NEP-2020, which emphasizes competency-based learning and the integration of 21st-century skills in education. It highlights the need to align teaching practices with evolving educational demands, equipping educators with practical strategies to enhance critical thinking, creativity, collaboration, and digital literacy. The study offers evidence-based recommendations for policymakers and curriculum developers to design effective teacher training programs, in line with NEP-2020's vision for continuous professional development (CPD). By fostering innovation in teaching, this research ensures that education remains relevant, inclusive, and transformative, preparing students for a rapidly evolving global landscape.

Methodology

This study adopts a review-based methodology to explore the relationship between teaching competencies and 21st-century skills, aiming to provide a deeper understanding of their interconnectedness. Through an extensive review of scholarly articles, policy documents, and case studies, the study examines how teaching competencies can support the development of essential skills like critical thinking, collaboration, creativity, and digital literacy. The research focuses on how educators can foster these skills, offering strategies to integrate modern teaching practices with evolving educational needs.

The methodology involves three key steps: data collection, thematic analysis, and critical synthesis. The data collection gathers diverse perspectives, while the analysis categorizes the literature into themes like teaching strategies and competency frameworks. The synthesis identifies patterns, gaps, and best practices for integrating teaching competencies with 21st-century skills. The findings provide actionable insights for teachers, policymakers, and curriculum developers, emphasizing the vital role of teaching competencies in preparing students for a dynamic, technology-driven world.

Teaching Competencies Influence the Integration of 21st-Century Skills into Educational Practices

Teaching competencies are essential for integrating 21st-century skills into educational practices. In today's world, characterized by rapid technological advancements and global interconnectedness, traditional teaching methods alone are no longer sufficient. Modern education requires teachers to possess a diverse set of competencies that go beyond subject knowledge. These competencies enable educators to nurture critical skills such as creativity, critical thinking, collaboration, communication, and digital literacy skills vital for success in the digital age.

Competent teachers are key to successfully embedding these skills into the classroom. By adopting learner-centered teaching strategies, leveraging technology, and promoting a culture of innovation, educators can enhance students' ability to apply knowledge in real-world contexts. Methods like project-based learning and the use of digital tools allow students to engage with content actively, promoting deeper learning, adaptability, and the development of transferable skills that will be essential in their future careers. These approaches prepare students to navigate a rapidly changing world with critical thinking and collaborative skills.

However, the integration of 21st-century skills requires continuous professional development. Teachers must stay updated with the latest pedagogical approaches and technologies to meet the evolving needs of the curriculum and diverse learner populations. Ongoing training ensures educators are equipped to address challenges such as resource limitations and resistance to change, both of which can impede the effective adoption of new teaching methods. Providing structured support through training and mentoring can help overcome these barriers, enabling teachers to integrate modern pedagogies with traditional methods effectively.

Ultimately, strengthening teaching competencies plays a vital role in preparing students for a competitive global environment. By fostering critical thinking, creativity, and collaboration through student-centered methods and technological integration, teachers create dynamic learning environments that empower students to thrive in the complexities of the 21st century.

REVIEW BASED DISCUSSION

The integration of 21st-century skills into education is crucial for shaping the future of learning. Teaching competencies play a central role, as educators' ability to adapt to modern demands and employ innovative strategies impacts students' development of critical skills like collaboration, creativity, critical thinking, and digital literacy. The studies reviewed emphasize the importance of teaching competencies in fostering these skills at various educational levels, from primary to higher education, and across diverse geographic contexts.

Teaching Competencies and Blended Learning

Several studies have explored the role of teaching competencies in implementing blended learning environments, where technology is integrated with traditional teaching methods. Mushtaq B.L. (2023) investigated the engagement of secondary students in blended learning, emphasizing the need for continuous innovation in teaching to meet students' evolving academic needs. This research highlights the importance of educators possessing strong technological competencies and the ability to effectively combine online and face-to-face teaching methods. Fostering student engagement and enhancing academic performance through blended learning requires teachers who can utilize technology to enrich learning experiences.

Similarly, Mushtaq M. *et al.* (2024) stress the significance of educator training in hybrid pedagogies, including blended and flipped learning, to improve digital skills and academic outcomes. These pedagogies foster essential 21st-century skills such as critical thinking, problem-solving, and collaboration, which are crucial for student success in a digital and interconnected world. The studies underscore the necessity for teachers to be well-versed not only in technology but also in effective pedagogical strategies that support the development of these skills. Thus, continuous professional development in both digital literacy and innovative teaching practices is essential for educators to effectively implement blended learning and prepare students for future challenges.

Teacher Competencies and 21st-Century Skill Development

The development of 21st-century skills, such as innovation, digital literacy, and critical thinking, is a recurring theme in the reviewed studies. Mekala and Harishree (2020) emphasize that integrating these skills, particularly in engineering education, is essential to preparing students for modern challenges. They argue that teachers must possess the necessary competencies to integrate such skills into their teaching. Similarly, Sanchez (2021) explored how technology integration can support the development of higher-order thinking skills, highlighting the need for educators to use technology not just for content delivery, but also to foster critical thinking and problem-solving.

Studies by Fung, Poon, and Ng (2022), and Abdullateef (2021) show that tools like Kahoot and Flipgrid are effective in promoting 21st-century skills. These blended learning tools engage students in active learning, enhance collaboration, and stimulate critical thinking. However, to effectively integrate these tools, teachers must possess both technological and pedagogical competencies. Ogegbo and Aina (2022) further support this by showing that educators' perceptions and their ability to use technology effectively are essential for fostering 21st-century skills, particularly in early childhood education. The studies collectively highlight the importance of teacher competencies in leveraging technology to nurture critical skills that students will need to succeed in the future.

The Role of Pedagogical Approaches in Skill Development

Effective teaching competencies go beyond technological proficiency to include pedagogical strategies that foster the development of 21st-century skills. A consistent theme across the reviewed studies is the transformative impact of student-centered pedagogies, such as flipped learning and project-based learning, in cultivating critical skills like collaboration, critical thinking, and problem-solving. These approaches shift the focus from traditional teacher-led instruction to active student engagement, empowering learners to take ownership of their education.

Research by Husin *et al.* (2016) and Bani-Hamid and Abdullah (2019) highlights the effectiveness of project-oriented and problem-based learning in enhancing 21st-century skills, particularly within STEM education. Their findings demonstrate that these methods not only improve subject-specific knowledge but also nurture teamwork, adaptability, and critical thinking. For successful implementation, educators need strong subject expertise and the ability to guide students through complex projects while fostering independent problem-solving. These competencies are vital for preparing students to confront real-world challenges.

Additionally, Rayna and Striukova (2021) emphasize the role of innovative learning environments like makerspaces and Fab Labs in promoting entrepreneurship, creativity, and critical thinking. These spaces allow students to experiment, design, and develop practical solutions to real-world problems. Teachers in these environments must possess specialized competencies to facilitate innovation, support entrepreneurial thinking, and guide creative processes.

The findings suggest the need for teacher training programs to incorporate pedagogical strategies that align with 21st-century education goals. By equipping educators with the skills to implement student-centered, innovative, and problem-based learning, education systems can better prepare students for success in collaborative, creative, and entrepreneurial roles in an increasingly complex world.

Cultural and Contextual Factors in Teacher Competencies

The reviewed studies highlight the importance of teaching competencies, while also recognizing that these competencies are not universal and can vary across different cultural and contextual settings. Research by Achwarin (2009) in Thailand and Srivastava & Pratibha (2009) in Uttar Pradesh, India, reveals that factors like educational qualifications, gender, and teaching experience influence teaching competencies. These studies show a positive correlation between teacher competence and factors such as higher education and teaching experience, emphasizing the need for continuous professional development in diverse cultural and educational contexts to help teachers effectively integrate 21st-century skills into their practices.

However, other studies, such as those by Sabu (2010) and Ganaie & Mudasir (2014), suggest that the effectiveness of in-service training programs and gender differences in teaching competencies are highly context-dependent. For example, Ganaie & Mudasir (2014) found that male teachers in Srinagar exhibited higher teaching competence, pointing to a gender gap in teaching effectiveness. This underscores the need for teacher training programs to be tailored to specific demographic factors such as gender and location. Ensuring that all teachers, regardless of gender or geographic setting, receive adequate support is essential for enhancing their ability to integrate 21st-century skills into their teaching practices.

Teacher Training and Professional Development in the context of NEP-2020

The reviewed studies emphasize the critical role of teacher training in effectively integrating 21st-century skills into educational practices, aligning with the National Education Policy (NEP) 2020's vision of competency-based learning. Research by Cretu (2017) and Uche and Eze (2020) highlights the importance of teacher education programs that focus on critical thinking, creativity, and innovation. According to NEP-2020, such programs are essential for developing holistic, well-rounded students who can thrive in a rapidly evolving global environment. Teachers equipped with these competencies are better positioned to create collaborative, engaging, and innovative learning environments that support students' overall development.

Further studies by Priya (2020) and Vidushy (2020) underline the importance of soft skills like effective communication and stress management in shaping teaching competencies. These interpersonal skills are vital for creating supportive and dynamic classroom environments, a key element of the NEP-2020's focus on social-emotional learning. Teachers who possess strong emotional intelligence and communication skills can address diverse student needs, manage classroom dynamics effectively, and foster a positive learning atmosphere that enhances student participation and critical engagement.

These findings underscore the need for comprehensive teacher education programs that go beyond subject knowledge, as advocated in NEP-2020. These programs should integrate the development of interpersonal, emotional, and critical thinking skills, preparing educators to meet the multifaceted demands of modern classrooms. By equipping teachers with the competencies to integrate 21st-century skills, these programs are instrumental in transforming education and ensuring that students are well-prepared for success in an interconnected, competitive world.

In conclusion, teaching competencies are crucial for integrating 21st-century skills, as emphasized by NEP-2020. The policy stresses the need for technologically proficient, pedagogically skilled, and emotionally intelligent teachers who can design student-centered, technology-enhanced learning environments that foster creativity, critical thinking, and collaboration. Additionally, teacher training and professional development programs must account for cultural, gender, and contextual factors to ensure all educators are prepared to meet the challenges of the modern classroom. The continuous evolution of teaching competencies is vital for shaping the future of education and preparing students to navigate the complexities of the modern world.

CONCLUSION

In conclusion, the integration of 21st-century skills into educational practices is significantly influenced by the teaching competencies of educators, as emphasized by the National Education Policy (NEP) 2020. The policy highlights the importance of teachers possessing a broad range of competencies, including technological, pedagogical, and interpersonal skills, to create dynamic and engaging learning environments. These competencies enable educators to foster critical skills like collaboration, creativity, problem-solving, and digital literacy, which are essential for preparing students for success in a rapidly evolving global landscape.

The studies reviewed underscore that competent teachers are essential for implementing innovative teaching strategies such as blended learning, flipped classrooms, and project-based learning, all of which align with the goals of NEP-2020. These strategies are crucial for nurturing 21st-century skills, as they promote higher-order thinking, critical reflection, and collaboration among students. Teachers who are proficient in integrating technology and student-centered pedagogies enhance both academic

performance and students' preparedness for the challenges of a complex, interconnected world.

Moreover, the NEP-2020 stresses the importance of ongoing professional development and teacher training to ensure educators continuously adapt to the latest technological advancements and evolving educational standards. Teacher training programs should focus on integrating critical thinking, creativity, and digital tools into curricula, equipping educators to meet the demands of the 21st-century classroom.

Cultural and contextual factors also play a crucial role in shaping teaching competencies. NEP-2020 advocates for context-specific teacher training programs that address the unique challenges educators face in different regions, ensuring that all teachers are adequately prepared to develop 21st-century skills in their students.

Ultimately, the future of education depends on teachers' ability to integrate 21st-century skills into their practices. By strengthening teaching competencies and supporting educators through continuous professional development, we can ensure that students are equipped to thrive in the modern world with confidence and competence.

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