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The SWOT Analysis of Teacher Training Programs for 21st Century Skills: A Critical Analysis

Ali Abbas[1], Syed Mohsin Ali[2] & Hina Akhtar[3]

[1]*College of Political Science, Henan Normal University Henan China; Assistant Professor, MY University Islamabad Pakistan, Email: alinagriccnu@gmail.com*
[2]*Department of Management Science, Lecturer at Indus University, Karachi, Pakistan Email: mohsinali.fms@indus.edu.pk*
[3]*M.Phil. Scholar, Department of Education, The Women University, Multan, Punjab, Pakistan, Email hinaakhtar881@gmail.com*

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ABSTRACT

The 21st century change in the education systems has largely been based on teacher training programs which have been more geared towards the development of higher-order thinking skills, digital literacy, creativity, collaboration, critical thinking and socio-emotional skills rather than the traditional rote memorization skills. Within this fast-changing educational environment, educators are anticipated not only to be knowledge providers but also learning facilitators who can incorporate new pedagogies and new technologies in the classroom. Teacher education programs are thus highly important in preparing teachers to meet the demands of globalization, technological advancements and changing labor market demands. The paper employs SWOT (Strengths, Weaknesses, Opportunities, Threats) analytical model to critically evaluate teacher training programs with special reference to how they can instill 21 st -century skills. Among the internal strengths that are the subject of the analysis, there are the curriculum reforms, the introduction of the learner-centered pedagogies and increasing attention to professional development. Nevertheless, it also singles out the systemic shortcomings such as the lack of infrastructure, the lack of practical training, the lack of digital integration, and the lack of theory-practice alignment. Externally, the research considers the opportunities available due to technological innovation, international partnerships, policy changes and growth of online learning platforms. Meanwhile, it identifies such threats as unequal distribution of resources, opposition to change, unstable policies, and unequal access to training in developing contexts. These dimensions synthesis provides the strategic recommendations in the research that may help in improving the teacher education systems, improving the quality of instructions and efficient preparation of teachers to meet the multi-faceted demands of the 21 st century education.

Corresponding Author's Email: alinagriccnu@gmail.com

Introduction

The education systems are under major demands by the fast-changing world economies that are accelerating due to digitalization, globalization and knowledge-based industries. The key element of this change is the notion of 21st century skills, which include critical thinking, creativity, collaboration, communication, digital literacy, and lifelong learning skills. Teacher training programs (also known as teacher education or professional development programs) are thus coming under pressure to equip teachers who are able to develop these skills in learners.

An increasing body of literature highlights that one of the most important factors in student achievement is teacher quality, and teacher preparation programs have become a focal point of educational reform (Darling-Hammond, 2017). Nevertheless, even though the integration of 21st century skills in the curriculum is a highly discussed policy issue, there is still a huge disparity between the theoretical frameworks and practical application in teacher training programs (Almazroa and Alotaibi, 2023). This gap demonstrates that systematic assessment instruments, such as SWOT analysis (Strengths, Weaknesses, Opportunities, Threats), are required to critically evaluate the effectiveness, challenges and future directions of these programs.

Regarding strengths, modern teacher education programs are increasingly competency-based, digital-oriented, and reflective in line with such international standards as the European Digital Competence Framework for Educators (Caena & Redecker, 2019). Learner-centered approaches, interdisciplinary instruction, and the incorporation of technology-enhanced learning environments are also a focus of many programs and are critical to developing the 21st century competencies (Chalkiadaki, 2018).In addition, the programs promoting lifelong learning (CPD) and evidence-based teaching have also improved the capacity of teachers to address evolving educational requirements.

Nonetheless, there are still serious flaws. Research has shown that most teacher training programs have disjointed curricula, lack of practical exposure, and lack of correspondence between theoretical teaching and classroom realities (Ruettgers, 2013). Furthermore, the definition and assessment of 21 st century skills are not always clear and agreed and hence causes inconsistency in their application across various institutions (Varas et al., 2023). In other situations, teacher educators themselves might not have the required competencies or resources to model and teach these skills (Işik and Demirel, 2023).

There are high possibilities of enhancement of teacher training programs. The advancement of technology in the sphere of education, artificial intelligence, and online learning platforms give a new opportunity to train teachers on the personalized and scalable manner. Reform frameworks are also offered by global collaboration and policy initiatives, allowing countries to benchmark and adopt best practices (Lamb et al., 2017). Moreover, the recent increase in the consciousness of the importance of 21st century skills has led to the augmented expenditure in teacher education reform and research based program design (Greenhill, 2010).

On the other hand, there are a number of threats that can impede development. These include institutional resistance to change, funding, policy inconsistency and socio-economic disparities that diminish the access to high-quality training. Furthermore, the rate at which technology is changing might be too high to allow the teacher education system to accommodate the change, resulting in outdated curricula and skill gaps (Bellei & Morawietz,

2016). The stress to achieve standardized testing standards can also be incompatible with the larger, more comprehensive objectives of 21st century education.

In this regard, SWOT analysis can be a critical and systematic way of evaluating teacher training programs. It allows the stakeholders to recognize the internal strengths and weaknesses as well as taking into consideration the external opportunities and threats, thus informing the strategic planning and policy development. Such a critical analysis approach does not only assist in determining the gaps that are there, but also gives an idea on how the teacher education systems can be restructured in order to address the requirements of the 21st century (Joynes et al.,2019).

Literature review

Concept of 21st-Century Skills in Education

The 21st-century skills concept has become a significant part of the educational research community as systems around the world strive to match learning outcomes with the needs of a fast-paced, knowledge-based economy. Researchers have always claimed that the conventional approaches to education, which mainly emphasize memorization and subject-related knowledge, are inadequate in equipping students to multifaceted real-life problems. Rather, it is moving towards transferable, interdisciplinary skills that allow individuals to adapt, innovate, and engage in constant learning (Chalkiadaki, 2018; Van Laar et al., 2017).

Nevertheless, the literature also points to the fact that there has been a lack of conceptual agreement as various organizations and researchers define and categorize these skills differently. As an example, there are frameworks that focus on cognitive processes and those that include social, emotional, and digital aspects. According to Joynes et al. (2019), such a definitional ambiguity can be a barrier to the design of the curriculum and policy implementation because stakeholders can perceive the concept in different ways. Although these differences exist, there is a general consensus that 21st century skills are not individualized competencies but a holistic combination of knowledge, skills, attitudes and values.

Major Frameworks of 21st-Century Skills

Partnership for 21st Century Skills (P21) Framework

One of the most powerful and popular models used in the literature is the P21 framework. It categorizes 21st century skills into three interrelated areas: Learning and Innovation Skills (the 4Cs), Information, Media, and Technology Skills, and Life and Career Skills. This model is especially important as it focuses on the combination of these skills with the fundamental academic courses, instead of considering them as independent elements.

Voogt and Roblin (2010) emphasize that the P21 model encourages interdisciplinary learning, which means that students should use knowledge in the fields of global awareness, civic literacy, and environmental sustainability. Also, the framework emphasizes the significance of real-world learning environments, in which students participate in practical problem-solving and group projects. This strategy is an indication of a change in teacher-focused teaching to learner-focused pedagogies, which are critical towards the development of higher order thinking skills.

OECD Framework

The OECD framework offers a more holistic and socio-cultural approach to competencies in the 21st century. It classifies skills into three general domains; the ability to use tools in an

interactive manner, the ability to interact in heterogeneous groups, and the ability to act independently (Ananiadou and Claro, 2009). In contrast to other models, the OECD model pays a lot of attention to the ethical responsibility, social participation, and personal agency, as education should equip a person not only with the ability to work but also to be an active citizen.

Another significant aspect of this framework is the role of metacognition and self-regulation that allow learners to examine their thinking process and adjust to new circumstances. According to Martínez-Bravo and Sádaba (2022), these competencies are becoming more and more important in the world of information overload and a rapid technological change. The OECD framework offers a more holistic view of what it entails to be a competent learner in the 21st century by considering both cognitive and non-cognitive aspects.

Digital Skills and Education 4.0 Frameworks

The literature has seen a recent surge of linking 21st-century skills to digital competence and Education 4.0, as technology has increasingly impacted teaching and learning. Digital literacy is not considered as a separate skill anymore but as a background component that underpins other skills, including critical thinking, collaboration, and creativity (Van Laar et al., 2017).

Robinson (2017) underline that digital skills are not only technical skills, but also information evaluation, online communication, and the creation of digital content. Furthermore, the introduction of technologies like artificial intelligence, big data, and virtual learning environments has broadened the 21st-century skills to encompass data literacy and computational thinking. These changes underscore the importance of education systems to constantly revise curricula and instructional methods to keep up with changes in technology.

Core Components of 21st-Century Skills

Cognitive Skills

The competencies of the 21st century are founded on cognitive skills, which include critical thinking, problem-solving, and creativity. The skills assist learners in the interpretation of information, evaluation of evidence and the development of creative solutions to complex problems. According to Van Laar et al. (2017), the process of knowledge construction is also directly related to cognitive skills since learners must be active participants in the process, rather than passive receivers of information.

Moreover, creativity is also being recognized as a critical aspect of cognitive development particularly in the spheres where innovation and design thinking are crucial. Educational strategies that are often used to develop these skills are project-based learning and inquiry-based learning, which is what, challenges students to investigate, experiment, and reflect.

Interpersonal Skills

Interpersonal skills, such as collaboration and communication, are necessary to operate in various and interdependent environments. These competencies are not just the skills to collaborate with others, but also the skills to manage cultural differences, resolve conflicts, and establish relationships. According to Chalkiadaki (2018), contemporary workplaces are becoming more and more dependent on the team-based organization, which makes collaboration a vital competency.

Communication skills have also been transformed to incorporate digital communication whereby people need to communicate effectively through different platforms and media. This

involves verbal and written communication, but also visual and multimedia literacy, which are becoming more and more significant in the digital world.

Intrapersonal Skills

Intrapersonal skills are self-regulation, adaptability, resilience and lifelong learning, which allow people to control their learning and development. These competencies are highlighted in the OECD framework as critical in dealing with uncertainty and change (Ananiadou & Claro, 2009).

These competencies are strongly related to emotional intelligence, such as stress management, goal setting, and motivation. The intrapersonal skills in the context of lifelong learning make people able to constantly refresh their knowledge and skills, which is important in the fast-paced professional environment.

Digital Literacy

Digital literacy is a characteristic of 21st-century skills and is a broad concept, covering a variety of skills, such as information retrieval, critical thinking, digital communication, and content creation. According to Martínez-Bravo et al. (2021), digital literacy is an independent skill and a cross-cutting enabler, since it facilitates the growth of other competencies.

Moreover, digital literacy is the knowledge of ethical and social consequences of using technology, including data privacy, cyber security, and digital citizenship. With the ongoing changes in technology, digital literacy is getting more complicated, and learners need to acquire sophisticated skills in the fields of coding, data analysis, and artificial intelligence.

Challenges in Defining and Implementing the Concept

Although the notion of the 21st century skills is so popular, there are a number of problems with it, both theoretical and practical. One of the main issues that could lead to inconsistencies in curriculum design and assessment is the lack of a single definition (Joynes et al., 2019).

The other large obstacle is that such capabilities are difficult to measure especially the complex and situational such as creativity and collaboration. Traditional assessment methods, such as standardized tests, are often not adequate to assess these competencies (Van Laar et al., 2020).

Also, contextual variability issues can be noted, where the applicability and priority of various skills can be different in cultural, economic, and educational settings (Salas Pilco, 2013). Finally, the introduction of the 21st century skills into the existing education systems requires many changes in the training of teachers, curriculum and institutional frameworks, which can be hardly implemented.

Teacher Training Programs

Teacher education programs, also known as teacher training programs, are organized systems that are meant to equip individuals to the teaching profession and also to improve the skills of the teaching professionals. The focus of these programs is to prepare a mix of subject knowledge, pedagogical skills, classroom management skills, and professional values that will enable effective teaching. Teacher training is always mentioned in the literature as a key factor in the quality of education, and well-equipped teachers have a significant impact on student learning and the overall performance of the school (Robinson, 2017).

Teacher training programs may also be considered more broadly as a bridge between theory and practice in education whereby teachers are able to employ abstract pedagogical concepts to practical teaching strategies. Newer programs are more geared towards reflective practice, learner-centered education and competency based programs which are congruent to needs of the 21 st century education. Furthermore, these programs are dynamic; they keep on changing with the changes in technology, policy changes, and demands of the society (Stavroulia et al., 2018).

Teacher training programs are of various types.

Pre-Service Teacher Education

Pre-service teacher education is formal training programs that are taken by individuals prior to joining teaching profession, usually in universities, colleges of education or teacher training institutes. The combination of a set of theoretical studies, subject specialization, educational psychology, curriculum studies and supervised teaching practice (practicum or internship) constitutes these programs. The main idea is to make sure that the future teachers acquire not only conceptual knowledge but also practical teaching experience prior to entering the actual classroom setting (Darling-Hammond, 2017).

Literature stresses that the most effective pre-service programs are those which provide good combination of theory and practice in which student teachers are able to apply pedagogical concepts into practice in actual schools. But there are a number of studies that have demonstrated that the theory-practice gap has long existed with what is learnt in the universities not necessarily being applicable in the classroom. The more recent reforms in turn, revolve around the extended school based experiences, micro-teaching and reflective journals to enhance practical preparedness. In addition, digital pedagogy, inclusive pedagogy, and competency-based models have become more and more a component of pre-service programs, e.g., new teachers are ready to teach in various and technology-intensive classrooms.

In-service Teacher Training (Professional Development)

In-service teacher training Continuous professional development (CPD) or inservice teacher training is the process of improving the teaching methods, knowledge and skills of the teaching practitioners in their career. As opposed to pre-service training, in-service programs are continuous and may comprise workshops, seminars, online courses, peer coaching, mentoring, professional learning communities (PLCs) and school-based training programs. The central focus is to make sure that the teachers are not lagging behind the latest pedagogical trends, curriculum changes, and technological innovations (Burns, 2023).

Studies indicate that successful in-service training is long-term, participatory and practice-based, as opposed to a single training or lecture-based training. The programs that will more likely have an impact on the performance of educators and the academic achievements of students are active participation, classroom experimentation, and feedback mechanisms (Darling-Hammond et al., 2017). However, the challenges persist particularly in the developing nations where in-service training is mostly limited by lack of adequate funding, follow-up of training, over-burdening teachers, and not being relevant to the classroom needs. This means that many professional development programs fail to bring lasting behavior change in the teaching practices.

Key Components of Teacher Training Programs

The programs of teacher training are usually organized in terms of a number of interconnected elements that together lead to teacher competence and professional preparedness. The first significant element is content knowledge which is the mastery of the subject matter that a teacher is supposed to teach. In the absence of good content knowledge, the teacher might not be able to explain concepts clearly or correct student misconceptions (Afdal, 2019).

The second aspect is the pedagogical knowledge that entails the knowledge of how to efficiently teach through appropriate instructional strategies, assessment strategies and classroom management strategies. This involves the capability to distinguish teaching according to the requirements and learning styles of learners (Saimon, 2022).

The third important factor is practical teaching experience that is usually provided through internships, practicum placements, or micro-teaching. The practical learning enables the trainee teachers to translate the theoretical knowledge into practical learning set ups in the classroom and be assured on how to deal with the learners.

In addition, there is a growing trend in teacher education, whereby the teachers are now being oriented to the incorporation of technology where they are being taught how to utilize digital technology, learning management systems and multimedia resources to facilitate teaching. Lastly, reflective practice can be regarded as one of the most important as it helps teachers to constantly assess and develop their teaching process according to the classroom experience, the reaction of the students and themselves. All these would assist in coming up with efficient, adaptive and intelligent teachers who would have been capable of serving the modern day educational needs (Burns, 2023).

Models of Teacher Training

Traditional (Transmission) Model

The conventional approach to teacher training is teacher-centered, lecture-based, whereby knowledge is passed on by instructors to trainee teachers in a systematic and usually strict manner. This model focuses on theoretical knowledge, knowledge of the subject and assessment through exams. Although it offers a good academic base, critics claim that it does not always give enough focus on practical teaching skills and classroom realities, which means that the graduates will not be able to cope in the teaching real world (Sharma, 2015).

Constructivist Model

Constructivist model is based on the premise that learning is an active, experiential and socially constructed process. In this model, the trainee teachers are motivated to develop their own knowledge by means of engagement, collaboration and problem solving activities. This method is generally regarded to be more efficient in the development of the 21 st century teaching skills, because it encourages critical thinking, inquiry based learning and student centered teaching. Teacher educators are facilitators, not knowledge transmitters and they help the trainees to learn reflectively and through experience (Burns, 2023).

Reflective Practice Model

The reflective practice model focuses on the ongoing self-reflection, in which teachers methodically reflect on their teaching experiences to enhance their future practice. Reflection can be in terms of lesson effectiveness, student responses, and classroom interactions. The theory of reflective practice by Schoen states that teachers grow professionally through

reflection-in-action and reflection-on-action, which enables them to respond to the dynamic classroom situations. This model is especially significant in contemporary education, where flexibility and life-long learning are key professional qualities (Saimon, 2022).

Partnership and Collaborative Models

Collaborative models demand the establishment of robust alliances between universities, schools and learning communities, and the establishment of a sense of collective responsibility in the teaching education. These models educate their trainee teachers by way of shared activities, co-teaching, and peer observation, as well as mentoring of the experienced trainee teachers. Research has shown that such a collaboration results in better professional development because the trainees get to experience different teaching practices and real-life problems and therefore there is minimal difference between theory and practice (Sharma, 2015).

Technology-Enhanced and Blended Learning Models

With the evolving speed of educational technology, the blended learning models, which entail a mix of face-to-face training with online learning environment, is currently being imparted in most teacher training programs. These models are facilitative of flexible learning, digital resource availability and emergence of ICT competencies. They also train teachers in technology in respective classes. Training through technology has been proven to lead to greater engagement, access, and digital literacy, which is a significant aspect in the 21 st century education systems (Burns, 2023).

Teacher Training Programs Effectiveness

There is no secret that the quality of teacher training programs is one of the major aspects, which should be enhanced to increase the quality of education and student performance. It has been suggested that the beneficial nature of programs is when they offer coherent and sustained and practice based learning experience as opposed to fragmented or short interventions. Typical elements of high-quality programs include mentoring, classroom observation, feedback systems, and an opportunity to participate in continuous professional reflection (Darling-Hammond, 2017).

In addition, the positive teacher training is closely linked with student centered learning outcomes as better trained teachers can adapt teaching, to suit a diversity of students and to provide interesting learning scenarios. Nonetheless, the situational aspects like institutional support, policy alignment, resource and teacher motivation availability lean towards an impact on the effectiveness. Therefore, teacher education needs to be reformed systematically and over the long-run to ensure quality of programs (Orland-Barak & Wang ,2021).

Challenges and Limitations

Even though the teacher training programs are of paramount importance, a number of challenges are yet to be experienced. Among the key concerns is theory-practice gap, as trainees find it difficult to use theoretical knowledge in the actual classroom context. This is normally a shortcoming of practical exposure in training or bad school affiliations.

The other major concern especially in the developing areas is the resource limitation whereby the institutions of teacher training might not be well equipped; the teachers might not be trained as well as lack access to digital materials. It is also identified by the constant conflict between standardization and contextualization as the national curricula are not always based on the needs of local education and cultural variations (Afdal, 2019).

Technological change is also a challenge and a number of teacher training programs have failed to keep up with the technological change like artificial intelligence, online learning platforms and data-driven learning systems. Lastly, teacher overload and insufficient continuous support may decrease the effectiveness of training programs in the long-term, and sustainability is another significant issue in teacher education reform (Orland-Barak & Wang, 2021).

Research Methodology

The research design used in this study is qualitative-descriptive research design, which is based purely on a SWOT analytical framework to critically analyze teacher training programs in 21st century skills because the qualitative approach allows an in-depth discussion of concepts, policies, practices and challenges unlike the quantitative approach, which focuses on quantifying the strength, weaknesses, opportunities, and threats of teacher education in the context of 21st century skills development To be credible and comprehensive, the study is based on secondary data and employs a systematic document review methodology, which includes peer-reviewed journal articles, books and book chapters, international policy reports (including OECD, UNESCO, World Bank, and P21 Framework), conference papers, doctoral dissertations, and reputable academic databases, such as Google Scholar, ERIC, Scopus, and ResearchGate. The keywords that were used to collect the data included: teacher training programs, 21st century skills, teacher education, professional development, and SWOT analysis in education, where inclusion criteria was based on relevance to the research topic, publication in the past 10-15 years (including seminal contributions), and direct focus on teacher training and contemporary competencies. The gathered literature was discussed and sorted systematically in the four dimensions of the SWOT framework with strengths being the current institutional frameworks, pedagogical innovations, and incorporation of digital competencies; weaknesses being the problems of outdated curricula, lack of practical exposure, and insufficient resource allocation; opportunities being the digital transformation, global collaboration, and new policy reforms to support the skills of the 21st century; and threats being the external challenges The SWOT analysis was the only analytical tool, which allowed the synthesis of the evidence in a comprehensive and yet structured manner, grouping and interpreting the evidence within these four dimensions, thus, allowing to have a holistic view of the internal and external factors that affect teacher training programs. The strategies used in the study to achieve validity and reliability included high-quality peer-reviewed sources, cross-checking of results in various documents, inclusion of different worldviews, and consistency of classification under the SWOT categories, which ensured transparency and rigor in the analysis. The ethical considerations were upheld by adequate citation and reference, plagiarism avoidance, correct representation of the original authors work and use of publicly available academic resources since no human subjects were involved. Although strong, the study has limitations in relying on secondary data, the possibility of publication bias, the lack of empirical validation of the field and differences in the conceptualization of 21st-century skills in studies, but it remains a well-organized and thorough assessment of teacher training programs. On the whole, the methodology based on SWOT analysis only provides a narrow, systematic, and critical analysis of the teacher education systems with reference to the 21st-century skills, which encapsulates the main internal competencies and external forces influencing their performance.

SWOT Analysis of Teacher Training Programs

Strengths

Among the positive features of the modern teacher training courses, the growing awareness of the significance of 21st-century skills in education should be listed. To support learner-centered pedagogies, including inquiry-based learning, project-based learning and collaborative pedagogies, many programs have implemented curriculum reforms. The strategies help to actively learn the student and learn to think at a higher level.

The other strength is incorporation of technology in teacher training. Digital tools, online courses and virtual classrooms have increased access and flexibility to training programs. Policies which seek to enhance the quality of teachers and globalization of education are also being adopted by governments and institutions of learning. This fostering is usually through the form of funding opportunities, institutional reforms and professional development programs. Moreover, the emphasis on cultivating the soft skills, such as communication and emotional intelligence, which is the key to effective teaching in a diverse classroom environment, is increasing.

Weaknesses

Though these are the strengths, there are many weaknesses which hamper the effectiveness of the teacher training programs. Among the most evident ones is the absence of the connection between the theory and the practice. Most of the programs though contain a lot of theoretical information; they lack the opportunities to translate the knowledge in the actual classroom situation. Therefore, teachers may fail to effectively implement modern pedagogical practices.

The lack of the digital competence development of teachers is another significant weakness. Although there is an increasing application of technology in training programs, majority of teachers lack confidence and skills necessary to apply the digital tools in training. Another factor is that in certain institutions, the old teaching styles that rely on lectures are still predominant, and thus, limits the chances of innovation and active learning. The second major issue is absence of follow up and continuity of the training programs. Teachers might not be able to maintain and develop the skills gained in training without continuous mentoring and professional development.

Opportunities

The teacher training programs could be enhanced in a lot of ways to make them more efficient and pertinent. The high rate of change in the field of education technology offers colossal opportunities of innovation in education and learning. The tools that can be used to design more personalized and engaging learning experiences include artificial intelligence, virtual reality and adaptive learning systems.

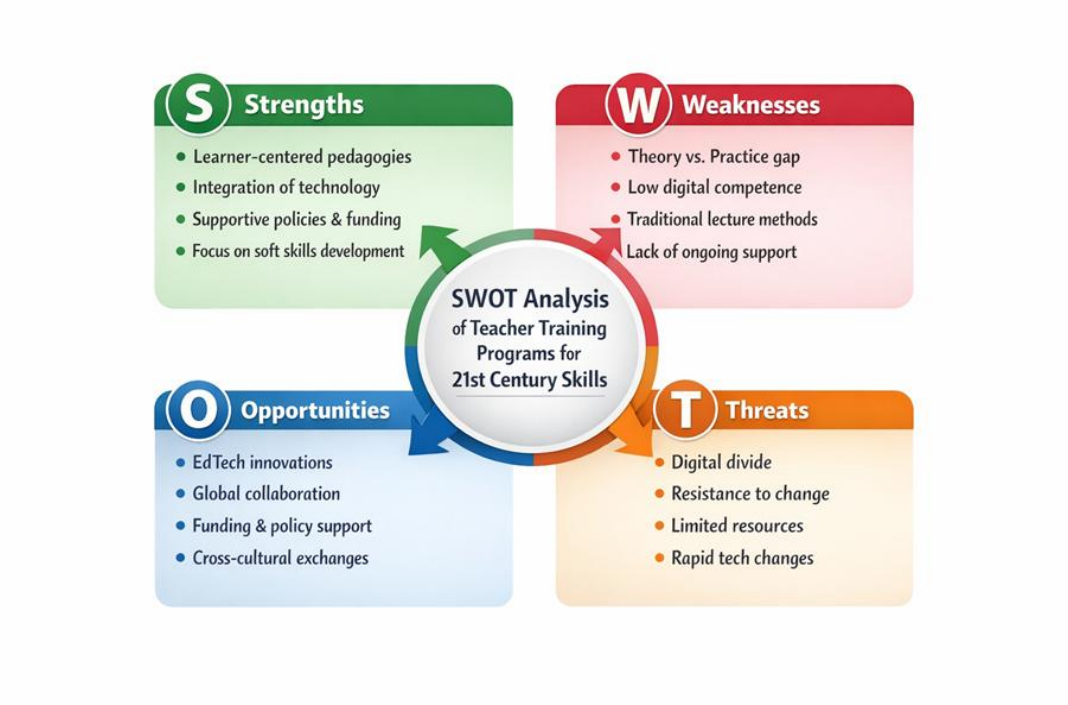
Globalization has also provided the possibility of cross border collaboration and sharing of knowledge. Teachers are able not only to access best practices across the globe, but also to engage in online professional learning communities and have cross-cultural experiences. Moreover, education and teacher training is being financed as well as policy opportunities are open to most governments and foreign agencies. The growing demand of skilled teachers who could help build the skills of the 21 st century also brings to the fore the necessity to improve teacher training programs and to make them topical to the new educational demands.

Threats

The effectiveness of the teacher training programs is challenged by a number of external issues. One of the most significant threats is the digital divide since it inhibits access to technology and online learning materials, particularly in low income and rural areas. This kind of imbalance might deter the use of technology-based training programs and widen the education gap.

The other risk that is critical is resistance to change among the educators. All teachers will not be prepared to adopt new teaching methods or even utilize technology in teaching and this is usually because of lack of confidence or knowledge. Financial and infrastructural resources are also limited and it is also a major challenge primarily in the developing countries where the education system may already be overstretched. Moreover, technology is evolving so fast and one can hardly abreast with the changes in the teacher training programs and there is a necessity to keep on revising the curricula and reorganizing it.

Figure 1: ***SWOT Analysis of Teacher Training Programs***



Discussion

The results of the literature review and SWOT-based analysis suggest that teacher training programs are in the middle of the stage of formation of 21st-century skills, but there is still a huge disconnect between policy expectations and reality. Although competencies like critical thinking, creativity, collaboration, communication, and digital literacy are recognized as vital in most education systems across the world, teacher education programs frequently find it difficult to fully incorporate the skills in both pre-service and in-service training models (Voogt and Roblin, 2010; Chalkiadaki, 2018).

One of the main problems found in the literature is the ongoing theory-practice gap whereby trainee teachers learn the theoretical content without having adequate experience in the real classroom to be able to effectively implement 21st-century pedagogies. This is further augmented by disunity between school and university in most environments that results in

fragmental professional training. Also, although the use of digital tools and Education 4.0 models is becoming increasingly popular, most institutions of teacher training lack the infrastructure and experience of trainers to implement technology-enhanced learning fully (González-Pérez and Ramírez-Montoya, 2022).

The other distinguishing fact is that the definition and measurement of 21st century skills is inconsistent. Different frameworks pay attention to a bit different competencies, which makes the situation in the sphere of curriculum planning and teacher preparation standards confusing. This non-standardization renders the standardization of teacher competency development in regions challenging. Besides, in-service training programs tend to be short based and workshop based that constrain the long term effects on teaching behavior and classroom innovations (Gümüş, 2022).

Nevertheless, the literature shows a number of strengths, despite these challenges. Competency based teacher education model, reflective practice system and blended learning system are introduced which have started being embraced in most of the countries. These trends have exhibited a gradual transformation to more liberal, learner-centered and skill-oriented teacher preparation systems. However, the institutional support, uninterrupted professional development, and policy commitment in the long-term are essential factors which predetermine the overall effectiveness of such reforms (González-Salamanca, 2020).

Conclusion

This paper has critically evaluated the teacher training programs in terms of acquiring the 21 st century skills by a SWOT based analytical framework. The review reveals that the systems of teacher education are undergoing a significant change whereby their systems are moving towards models of competency based and technology integrated models of knowledge transmission.

Nevertheless, in spite of these good trends, there are still significant implementation lapses, especially those pertaining to the alignment of content used in training with the specific needs of the real classroom and the necessary preparation of teachers to support the enhancement of 21st century competencies in students. The paper ends by finding out that even though the contribution of teacher training programs has gigantic potential to add to the existing educational objectives, the attainment is impeded by the structural, pedagogical and resource-based issues.

Therefore, the process of teacher education should be holistically and systemically empowered to integrate curriculum reform, continuous professional development, and effective use of digital technologies. Unless these are improved, the dreams of the complete inclusion of the 21 st -century skills into the education systems can be fulfilled to some extent.

Recommendations

According to the examination of the literature the following recommendations can be made that would assist in developing teacher training programs to obtain skills demanded in the 21 st century:

- Increasing the period and quality of school practicum experience should be done in teacher education institutions. They should ensure that the universities and schools are closely related in order to ensure that the trainee teachers are able to have a meaningful experience of the real classroom environment. Mentorship programs with

the participation of experienced teachers can also help in bridging the gap between theory and practice.

- The 21 st century skills of critical thinking, creativity, collaboration, communication and digital literacy are not applicable in teacher training curriculum, as stand-alone modules. This incorporation will ensure that the future teachers absorb these skills and apply them in their teaching practices.
- With the growing role that technology is playing in the educational sector, it would be recommended that teacher training programs incorporate a high degree of training on digital pedagogy, such as the use of learning management systems, artificial intelligence application, online classes, and digitalized evaluation systems. It has to undergo constant changes so as to keep pace with the technological changes.
- In-service training: the training must be converted into a model of lifelong and in-service professional learning and not a workshop. Learning communities (PLCs), peer coaching, and collaborative action research should be supported at schools and help to promote long-term teacher development and classroom improvement.
- To minimize the ambiguity and enhance the consistency in teacher education programs, educational policymakers ought to strive to come up with a more integrated and context-based framework of 21 st century skills. It would help to bring the national standards of teachers in line with the international best practices.
- Education authority and governments must invest in infrastructure, teaching resources, as well as, training of trainers. The well-thought-out teacher training programs may not produce the desired outcomes without the relevant financing and support on an institutional level.
- Teacher training programs will be aimed at promoting reflective practice and classroom research, thereby, allowing teachers to reflect and improve their teaching practices at all times. This will aid in making adaptive and innovative teaching professionals.

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