International Journal of Web of Multidisciplinary Studies
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
website: https://ijwos.com
Volume 3 Issue 5 , May 2026
E-ISSN : 3049-2424
DOI: https://doi.org/10.71366/ijwos03052634373

A Study of Teachers' Readiness for Technological Innovations in Competency-Based Assessment

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Article Info

Article History:

Published:31 May 2026

Publication Issue:
Volume 3, Issue 5
May-2026

Page Number:
694-702

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Abstract:

The fast development of technology has seen many changes occur in the education sector, especially in the process of teaching-learning and assessment procedures. The traditional mode of assessment that involved cramming and testing students' ability to recall facts is slowly being phased out through Competency-Based Assessment (CBA). CBA stresses assessing the learner's practical skills, problem-solving, critical thinking, creativity, and communication capabilities, among others. In the current dynamic learning environment, technology advancements like artificial intelligence, digital learning programs, online assessments, learning management systems, smart classrooms, educational software, and big data analysis are becoming essential parts of modern education. Nevertheless, the effective adoption of these technologies heavily relies on teachers' preparedness, digital competency, and attitudes.

The current review paper discusses the issue of teachers' preparedness for the introduction of innovations within competency-based assessment, particularly in secondary schools. The objectives of the current paper include the exploration of teacher readiness, the importance of technological innovations in competency-based assessment, literature review, and discussion of the main challenges and opportunities for teachers that arise when introducing technologies in assessment processes. The review will be conducted based on the analysis of numerous sources dedicated to the topics of educational technology, digital competency, teacher preparedness, and competency-based education.

According to the findings from the literature review, teacher readiness is a multi-faceted construct that involves digital literacy, technological competence, pedagogical competence, self-confidence, openness towards innovation, and positivity about technology. The use of digital assessment tools in class becomes much easier when teachers have sufficient technological skills and are properly trained. Digital innovations come with various benefits such as personalization, timely feedback, effective data management, constant assessment, better engagement from students, and increased assessment transparency. Some of the innovations include AI-based assessment tools, online quizzes, e-portfolios, interactive apps, and learning management systems.

The review also points out some of the obstacles that influence teachers' preparedness for technology advancements. Some of the significant obstacles include poor digital literacy, poor infrastructural facilities, poor internet connection, lack of proper training programs, resistance to change, higher workloads, technical problems, and lack of organizational support. The studies also show that urban teachers have more technological preparedness than rural teachers since they have better access to digital materials and training programs.

The article stresses the significance of developing professional development initiatives, information communication technology training, infrastructure development, policy development, and incorporating digital pedagogy in teacher education programs. Educational institutions and policymakers must concentrate on

improving the technological proficiency of teachers and fostering learning conditions for implementing competency-based assessment effectively. In conclusion, the article identifies that teachers' preparation is a key component in the successful incorporation of technological innovation in the education process. Improving the digital competency and preparedness of teachers will not only lead to improved assessment processes but will also ensure quality education and learner-centered pedagogy.

Keywords: Teacher Readiness, Technological Innovations, Competency-Based Assessment, Digital Competency, Educational Technology, Artificial Intelligence, Secondary Education

1. Introduction

In the modern era, there have been tremendous transformations in the field of education because of science and technology, globalization, and the changing needs of society. In this era, the conventional approach of learning through rote and exams cannot cope with the challenges of the contemporary world anymore. Modern education focuses on acquiring competencies like critical thinking, creativity, communication, problem-solving skills, and so forth. Consequently, there is a trend towards competency and learner-oriented approaches in modern education.

Competency-Based Assessment (CBA) is one of the essential innovations in education today that centres on assessing the skills, knowledge, attitude, and practical application of learning among students. Competency-based assessment differs from other approaches in that it assesses students not only in terms of their theoretical knowledge but also examines their ability to apply what they learn in practice.

On the other hand, technology innovations have greatly affected educational systems. Current technology, such as Artificial Intelligence (AI), Learning Management System (LMS), e-learning system, assessment technology, smart classrooms, mobile applications, and educational analytics has revolutionized the teaching and learning process. They increase efficiency, flexibility, interaction, and the student-centrality of the assessment process. Technology facilitates personalized learning through monitoring of students' performance and giving instant feedback to the learners.

However, the effective application of technological innovations to competency assessment will mainly depend on teachers' readiness. Teachers are the main drivers of educational change since they facilitate implementation of policies and pedagogical techniques in the classroom settings. Teacher readiness means the willingness, ability, readiness, and competence of teachers to use technologies in education. Recent educational reforms in India, like NEP 2020, have put great emphasis on competence-based education, digital learning, and incorporation of technology in educational institutions. Teachers are encouraged to adopt innovative assessment practices and technologies to enhance the quality of teaching and learning. Thus, there is a need to examine teachers' readiness for technology innovations in order to achieve successful educational transformation.

The current review paper seeks to explore teachers' readiness for technological innovation in competence-based assessment through critical examination of relevant literature on challenges and opportunities.

Objectives of the Study

Some of the main aims of the current literature review paper include:

- Identifying the definition of competency-based assessment.
- Exploring the influence of technology innovation in education.
- Analysing the notion of teacher preparedness for technology innovations.
- Reviewing relevant literature on teacher preparedness and competency-based assessment.
- Highlighting the problems faced by teachers in implementing technology into assessment practices.
- Proposing ways to enhance teacher preparedness for technology innovations.

Concept of Competency-Based Assessment

Competency-Based Assessment refers to an assessment strategy whose focus is on measuring the learners' competence in applying their knowledge, skills, attitudes, and values in real-life scenarios. Competency-based assessment guarantees that the learners get quality learning experiences, enabling them to solve life problems effectively. The emergence of the idea of competency-based education was driven by the necessity to ensure that education was practical and learner-centered. Competency-based education is based on the mastery of learning, whereby the learners progress after they show adequate competence in particular competencies. This form of assessment is not confined to examinations but embraces a wide range of activities including projects, presentations, portfolio, practical work, role plays, discussions, case study analysis, and teamwork. Competency-based assessment is characterized by continuous and comprehensive traits. This type of assessment allows learners to showcase their skills and competencies using various methods of assessment. The assessment procedure centers more on feedback, development, and growth than on grading learners.

Some of the significant features of competency-based assessment include:

- Learning outcomes and competencies
- Being student-centered
- Continuous and comprehensive
- Application in real life
- Performance-based
- Higher-order thinking skills development
- Individualized learning
- Multiple methods of assessment

Teachers contribute greatly to competency-based assessment because they come up with meaningful activities, observe student performances, and give feedback. Technology also plays a crucial role in improving the effectiveness of competency-based assessment through the use of digital tools.

Technological Innovations in Education

Technological innovations imply the application of contemporary technologies in the process of improving teaching and learning experiences. Information and communication technology has progressed rapidly and revolutionized the entire educational system throughout the world. Technology has rendered education easy, flexible, interactive, and learner-centered.

Artificial Intelligence (AI) is one of the most significant technological innovations in the field of education. AI-enabled applications assist teachers in evaluating the performance of learners, creating personalized learning paths for each learner, automating the process of evaluation, and providing instant feedback. Tools such as Learning Management Systems (LMS) which include Google Classroom, Moodle, Blackboard, and Microsoft Teams have become increasingly important in the management of online learning and assessment. Through these systems, instructors can upload learning materials, assign tasks, administer tests, track students' attendance, and assess their performance through digital means.

There are many engaging and interesting tools used in online assessments such as Kahoot, Quizizz, Menti meter, Socrative, and Google Forms. These tools offer immediate feedback to the instructor on the comprehension levels of the learners. Smart classes with interactive boards and projectors are also part of the same category. Educational data analytics is one more innovation which assists teachers in monitoring student performance and detecting gaps in their knowledge. E-portfolios allow students to demonstrate their skills, accomplishments, and practical experience online. Mobile learning apps and educational web resources help facilitate flexible learning.

There are many advantages associated with technological innovations, including increased student engagement, personalized learning, streamlined record keeping, collaborative learning experiences, and flexible assessment strategies. Nevertheless, technological innovations cannot be fully utilized without sufficient teacher digital literacy.

Teacher Readiness for Technological Innovations

Teacher readiness is the extent to which teachers are ready to adopt new technological innovations and incorporate them into their educational process. Teacher readiness includes the ability of teachers to use digital tools, technological skills, pedagogical knowledge, confidence, attitude towards new technologies, willingness to innovate, and competence.

Teacher readiness is a multi-dimensional construct. It does not only cover the aspect of knowledge about technology but also entails psychological and professional readiness. Technologically ready teachers are capable of utilizing digital tools effectively for education, learning, communication, and assessment.

A number of determinants contribute to the level of teacher readiness in terms of technological innovations. The first one is digital literacy. Teacher must be knowledgeable about computer applications, online resources, digital assessments, and the internet. Professional development and training also significantly improve teacher readiness. Those teachers who undergo adequate training in ICT are more confident and competent in using technology.

Institutional support, access to digital materials, Internet connections, and technical support services also enhance teacher readiness.

The attitude of teachers towards technology is an equally significant factor that needs to be considered. Positive attitudes prompt teachers to adopt new ways of teaching and using technology, while negative attitudes may lead to reluctance and hinder teacher readiness. Factors like motivation, self-efficacy, and prior experiences of teachers with technology can affect their readiness for integrating technology.

In competency-based assessment, teachers are required to design activities for learners, continuously assess them, evaluate their performance, and give feedback on their work. Technology facilitates teachers in performing these functions. Hence, teacher readiness is vital for competency-based assessment.

2. Review of Related Literature

There have been several empirical investigations on teacher preparedness in terms of embracing technological innovations and competency-based assessment. This body of literature is crucial in understanding opportunities, obstacles, and other factors associated with technology integration in educational settings.

In his paper published in 2019, Smith investigated digital competence and assessment practices among schools. It was revealed that teachers with excellent skills and ICT knowledge managed to effectively implement digital assessments. The researcher stressed the significance of professional development training for teachers.

Johnson and Brown (2020) investigated the application of Artificial Intelligence in the process of educational assessment. The researchers found that the use of AI enhanced personalized learning, grading, and feedback. Nevertheless, teachers experienced difficulties owing to a deficiency in technical skills and inadequate training.

UNESCO (2021) produced a report on digital learning and teacher preparedness. In its report, UNESCO pointed out that digital literacy and capacity building among teachers are crucial to incorporating technology in competency-based learning. Continuous training and policy support for teachers were recommended.

Sharma and Gupta (2021) conducted research on teachers' readiness for digital assessment in secondary schools in India. The study results showed that there are many challenges for teachers such as insufficient facilities, poor internet connection, and lack of ICT training. The study stressed the importance of government and infrastructure support.

Kaur (2023) conducted a study on the relationship between teachers' digital competence and competency-based teaching practice. There is a positive relationship between digital competence and effective assessment practice among teachers. Highly digitally competent teachers exhibit high self-efficacy in conducting online assessments.

The attitude of teachers towards the use of educational technology was investigated by Anderson (2022). It was found out that positive attitude and self-confidence played a crucial role in determining teachers' use of technological innovations in the classroom setting.

From the literature review, it can be seen that the willingness to adapt is an important factor in ensuring that the technology-based competency assessment process goes well.

Major Themes Emerging from Literature Review

Review of literature indicates the following major issues associated with teachers' readiness for technology innovations in competency-based assessment.

- Relevance of Digital Literacy

One of the most important issues that influence teacher readiness is the relevance of digital literacy. It refers to the need of teachers in necessary skills and knowledge to work with digital devices and technologies, as well as online learning platforms. Digital literacy will assist teachers in designing innovative learning activities and implementing technological assessment methods.

- Professional Development Opportunities

The participation in continuous professional development programs will enable teachers to acquire the necessary competencies. Training workshops, refresher courses, and seminars will increase the level of teacher competency in using digital assessment methods and implementing CBE.

- Attitude towards Technology

The attitude of teachers to the use of technology plays an important role in implementation innovations. Positive attitude towards technology will facilitate experimenting with innovative assessment methods.

- Support from School Administration and Infrastructure

Support from school administration and provision of adequate infrastructure is essential for integrating technology into teaching and learning. The schools should ensure that there is proper internet connectivity, devices, technical support, and conducive learning environments.

- Challenges Facing Teachers in Rural Schools

The teachers working in rural schools encounter more difficulties compared to those in urban areas because of poor infrastructure, no internet connections, and inadequate training.

Challenges Faced by Teachers

While technological innovation brings many benefits, there are numerous problems that arise for teachers during the implementation of technology into competence-based assessment processes. Lack of digital literacy and skills is one of the most important barriers. Not all teachers, especially older ones, are sufficiently prepared to deal with various technologies and tools. The process of working with software and online services may be problematic for some teachers.

Another major barrier relates to lack of proper infrastructure. Computer rooms, internet access, smart classes, and other necessary devices can be absent in some schools. Rural or poor schools usually suffer more from lack of infrastructure. Finally, resistance to changes is often observed among teachers. There is a preference of traditional

teaching techniques over modern technology. Some teachers find it difficult to embrace innovation because of fear of failure.

In addition, teachers face additional work pressure while creating digital learning materials, evaluating students digitally, and dealing with technical issues. The limitations of time and technical support add to these complications.

The issue of privacy and the ethical usage of artificial intelligence technology and online testing systems is yet another challenge faced by educators in today's modern world. There is an urgent need to sensitize teachers about the ethical aspects of technology. This list of challenges calls for a strategic approach for teachers' preparedness.

Opportunities and Benefits of Technological Innovations

Technological advancements offer many ways of making improvements to competency-based assessments and the quality of education. The first advantage of technology is personalized learning. Teachers use technology to find out the strengths and weaknesses of learners as well as their learning requirements. Adaptive learning techniques offer customized learning opportunities based on learner performance.

Another benefit of technology is that it facilitates ongoing assessment and evaluation. Online testing, assignments, digital portfolios, and interactive activities enable teachers to evaluate students continuously and give feedback immediately. It helps learners comprehend and improve academically.

Another strength of digital assessment tools is increased learner engagement. Interactive platforms, multimedia content, and gaming techniques make assessment fun and engaging for learners.

Technology enhances efficiency and transparency within assessments. The use of automated grading tools will minimize the burden on teachers and eliminate human error. Computer-based tracking systems assist in recording accurate information about learner's progress and performance.

One more advantage associated with the application of technologies is collaborative learning, as online discussion boards, group activities, and virtual classrooms facilitate effective communication and cooperation between learners.

Furthermore, technological advances facilitate the development of twenty-first-century skills, which are crucial for modern learners living in a globalized society.

Implications for Teacher Education

Teacher education institutions are very important because they prepare future teachers to embrace and cope with the technological changes and the practice of competency-based assessments.

It is important for the curriculum in teacher education institutions to incorporate ICT, digital pedagogy, online assessment techniques, education technology, and competency-based pedagogies. Future teachers need practical experience with the use of digital platforms and digital assessment tools.

In-service teachers need to be given ongoing professional development in order to learn more about ICT in schools. In-service training can be done in the form of workshops, seminars, orientation programs, and online classes.

Policymakers should come up with policies that promote the development of infrastructure, teaching of teachers, and digital inclusion. School administrators should create technical support and encourage teachers to adopt innovative modes of assessments.

Furthermore, teachers should be taught on how to embrace technology ethically and responsibly. It is vital that teachers are aware of digital citizenship, privacy of data, cybersecurity issues, and the ethical application of Artificial Intelligence in education.

Improving teacher education programs will enhance preparation and lead to successful implementation of competency-based assessment strategies.

3. Suggestions

The following recommendations could be made to make teachers better prepared for changes brought about by technological advances in CBA:

- ICT and digital assessment skills training should be provided for teachers on a regular basis.
- Better infrastructure for technology use should be ensured at schools, involving internet access, smart classrooms, and digital tools.
- There should be sufficient financial and technical resources allocated by the government and education authorities for technology incorporation.
- Teacher training programs should incorporate digital teaching and assessment techniques.
- Professional development courses should be offered to in-service teachers.
- A positive attitude towards technology should be fostered among teachers via incentives and encouragement.
- Communities for collaborative learning should be established among teachers to exchange innovative ideas.
- Rural schools should be prioritized in addressing the digital gap issue.
- Digital literacy, online ethics, and responsible AI application awareness should be increased.
- Policies supporting CB education with technology should be developed.

4. Conclusion

Advancements in technology have revolutionized educational practices and enabled new possibilities in competency-based learning and assessment. Competency-Based Assessment emphasizes the acquisition and assessment of practical skills, critical thinking, innovation, and applicability of knowledge by learners. Technological advancements like Artificial Intelligence, online assessments, learning management systems, and intelligent classrooms make the assessment process interactive, effective, flexible, and personalized.

Nonetheless, the adoption of technology-enabled competency-based assessment relies heavily on teacher readiness. Teachers should be competent in technology usage, knowledgeable about technology, understand teaching, feel confident, and have positive attitudes towards innovation. Literature review reveals that professional development, institutional support, availability of infrastructure, and policies greatly affect teacher readiness.

Despite the many challenges that teachers encounter when adopting innovation, there are plenty of benefits that technological advancement can bring. Challenges such as insufficient training, poor infrastructure, technological problems, resistance to change, and the digital divide exist in the implementation process. Some of the benefits include personalization, regular assessment, timely feedback, student engagement, and record management.

Collaborative efforts between educational institutions, policy makers, and teacher education programs are key in ensuring that teachers become technologically competent and provide conducive environments for learning. Training, infrastructural development, digitization, and technological education policies are key aspects in ensuring that teachers develop the required competency.

Teachers' readiness to adopt technological innovations plays an important role in the adoption of competency-based assessment techniques. Improvement in the level of preparedness and digital competency of teachers will result in quality education and acquisition of twenty-first-century skills by learners.

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