Pertanika Proceedings 1 (2): 7 - 11 (2025)

PERTANIKA JOURNALS

PERTANIKA PROCEEDINGS

Journal homepage: http://www.pertanika.upm.edu.my/

Secondary School Teachers' Formative Assessment Competencies in the Digital Environment: A Systematic Review

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ABSTRACT

In an increasingly digitalized educational environment, formative assessment is essential for effective student learning. It is crucial to study teachers' competencies, as their views and beliefs on this issue will greatly impact classroom teaching practices. This research aims to systematically elucidate the assessment competencies of teachers at the secondary school level. In order to address the research questions, guidelines from PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) were employed to systematically identify 15 out of 392 articles, spanning the period from 2020 to 2024, and retrieved from three databases, namely Scopus, WoS, and ERIC, in accordance with the established exclusion and inclusion criteria. The results show that (1) The challenges of effective mastery of formative assessment are limited by inadequate infrastructure, large class sizes, lack of digital training and lack of teacher self-efficacy, (2) Formative assessment enhances teacher competence through proper training and support, improving skills and teaching strategies, and (3) Formative assessments enhance student achievement through feedback, self-regulation, and adaptability. Policymakers are recommended to improve infrastructure, digital training, and support for teachers to optimize digital-based formative assessment.

Keywords: Digital environment, formative assessment, online assessment, secondary school, teachers' competencies

ARTICLE INFO

Article history:
Received: 12 December 2024
Published: 28 March 2025

DOI: https://doi.org/10.47836/pp.1.2.002

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INTRODUCTION

The 21st century brings rapid technological advances, presenting unique education opportunities (Memisevic et al., 2023). Education systems are tasked with preparing students to thrive by developing essential 21st-century skills such as critical thinking, creativity, collaboration, and

communication (Amilusholihah et al., 2024). However, its effectiveness depends on teacher competence, as studies show that formative assessment can improve student understanding and metacognitive abilities (Alt et al., 2023; Leighton, 2019). Despite its benefits, challenges persist, especially in digital formative assessments. Teachers often struggle with understanding and applying these techniques effectively (Khajeloo et al., 2022), with issues such as misconceptions, limited skills, and inadequate facilities (Wolf & Lopez, 2022; Yusof et al., 2022). Although research highlights the potential of digital tools in formative assessment, the impact of teacher competence on its effectiveness remains underexplored. This gap emphasizes the need to investigate how teachers' proficiency in formative assessment and digital tools influences student outcomes.

PROBLEM STATEMENT

The integration of digital formative assessments in education faces challenges due to teachers' limited competence in effectively utilizing them. Despite the recognized benefits of formative assessments in enhancing student learning and supporting personalized instruction, many educators struggle with understanding and implementing these tools effectively (Berisha et al., 2024; Khajeloo et al., 2022). This gap in teacher competence limits the potential of digital formative assessments to improve student achievement. Therefore, this study aims to explore how teacher competence in using digital formative assessments influences student learning outcomes, addressing the need for more effective implementation in education.

RESEARCH QUESTIONS

This study seeks to explore: How does the role of teacher competence in formative assessment affect student achievement supported by digital technology? This study uses a systematic literature review approach by following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines developed by (Liberati et al., 2009). The PRISMA stages are identification, screening, data extraction and eligibility to obtain review articles according to the criteria (which are included). The goal is for researchers to be able to identify and map similar research topics simultaneously (Agrawal et al., 2024). Figure 1 shows the article search process.

Between March 15 and July 10, 2024, a systematic review was conducted using Web of Science, Scopus, and ERIC databases. The review focused on studies from 2020 to 2024, resulting in 144 articles after screening. These studies, examining secondary school teachers' use of formative assessment in digital environments across 13 countries, emphasized the need for professional development. Teachers with higher digital competence, enhanced by formal training, showed improved student outcomes (Garcia et al., 2024; Gisbert-Cervera

et al., 2022). Challenges such as inadequate infrastructure and large class sizes hinder effective implementation (Rahman et al., 2021).

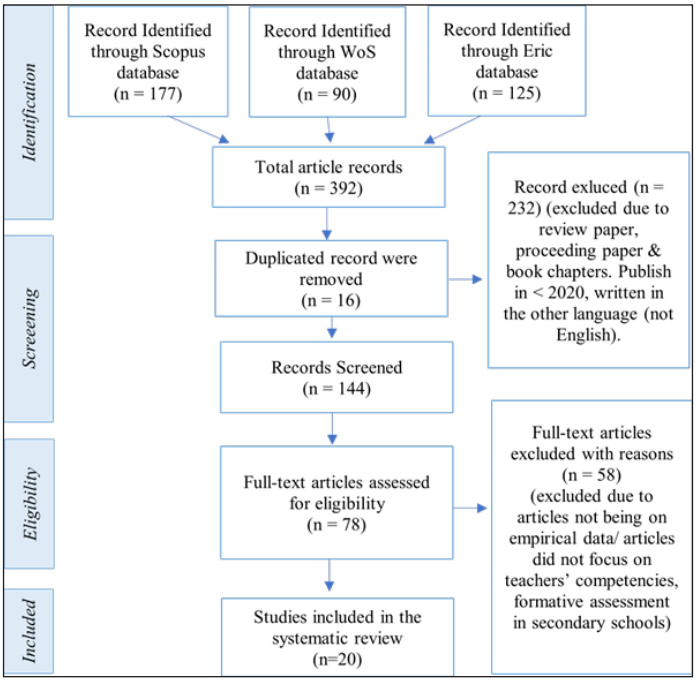

Figure 1. Flow diagram of systematic review process (PRISMA)

CONCLUSION

In conclusion, formative assessment, supported by digital technologies, enhances student achievement and fosters 21st-century skills. Effective implementation by skilled teachers provides valuable feedback for student growth. Prioritizing teacher training and equitable access maximizes its potential for an inclusive education system. However, this study's focus on teachers with high digital competencies limits generalizability, and its secondary school focus restricts broader applicability.

ACKNOWLEDGEMENT

The author expresses gratitude to Lembaga Pengelola Dana Pendidikan (LPDP) for supporting our Master's program.

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