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Analysis of Multiple-Choice Items in Physical Education Subject: A Systematic Literature Review

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Abstract
The study seeks to identify common trends, strengths, and weaknesses in the formulation and effectiveness of multiple-choice questions in evaluating students' knowledge and understanding of Physical Education, Sports, and Health concepts. A systematic literature review approach was employed, focusing on peer-reviewed journal articles and academic sources published within the last decade. Studies were selected based on their relevance to multiple-choice question analysis in Physical Education, Sports, and Health assessments. The analysis revealed several key findings regarding multiple-choice question construction in Physical Education, Sports, and Health assessments. Common issues include ambiguity in question wording, misalignment with curriculum objectives, and inadequate assessment of higher-order thinking skills. However, well-constructed multiple-choice questions were found to align effectively with learning goals, incorporate well-designed answer choices, and assess both lower-order and higher-order cognitive skills. The findings indicate that while multiple-choice questions remain a dominant assessment method in Physical Education, Sports, and Health, improvements are necessary to enhance their effectiveness. Recommendations include adopting standardized guidelines for question development, providing training for educators on multiple-choice question construction, and exploring alternative assessment formats to better evaluate students' comprehensive understanding of Physical Education, Sports, and Health concepts.

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INTRODUCTION

Assessment plays a crucial role in the educational process, serving as a tool to evaluate student learning, guide instructional decisions, and measure the effectiveness of teaching strategies (Brinkley et al., 2022; Zulkifli & Danis, 2022). One of the most commonly used assessment methods in education is multiple-choice questions. In Physical Education, Sports, and Health subjects, multiple-choice questions are often employed to assess students' theoretical understanding of sports science, biomechanics, nutrition, and health-related fitness concepts. Despite their widespread use, concerns remain about the validity, reliability, and cognitive level of multiple-choice questions in assessing students' critical thinking and problem-solving abilities (Abdullah et al., 2022; Weisman et al., 2023).

Several studies have examined the construction and effectiveness of multiple-choice questions in various academic disciplines, yet limited research focuses specifically on their application in Physical Education (Bye et al., 2024; Foote et al., 2024). The novelty of this study lies in its comprehensive review of existing literature to analyze the strengths and weaknesses of multiple-choice questions in the context of Physical Education assessments. This study aims to bridge the gap by identifying trends, common flaws, and best practices in designing multiple-choice questions that effectively measure student learning outcomes in Physical Education, Sports, and Health education (Chen, 2024; Hanish et al., 2023).

Existing research on multiple-choice question analysis highlights various aspects such as item difficulty, question discrimination, validity, and reliability (Zhang et al., 2024). Studies have shown that well-structured multiple-choice questions can accurately assess student knowledge and comprehension. However, many assessments still suffer from poor question design, including ambiguous wording, ineffective distractors, and a lack of alignment with learning objectives. Additionally, research suggests that multiple-choice questions often emphasize lower-order cognitive skills such as recall and recognition rather than higher-order thinking skills like application and analysis. This study builds upon these findings by systematically reviewing the latest literature on multiple-choice question construction in Physical Education.

In the context of Physical Education assessments, the need for effective evaluation tools is becoming increasingly important, particularly as education shifts toward competency-based learning (Bering & Schulz, 2024). Many Physical Education assessments rely on practical performance tests, but theoretical knowledge remains an essential component of student evaluation. Thus, developing well-constructed multiple-choice questions that align with educational objectives and effectively measure both lower-order and higher-order cognitive skills is crucial. A systematic literature review can provide valuable insights into how multiple-choice questions are currently designed and how they can be improved to enhance student learning in Physical Education (Hao et al., 2024).

This study aims to provide an in-depth analysis of multiple-choice question construction in Physical Education assessments by reviewing existing research on question quality, validity, and cognitive level distribution. By identifying best practices and common pitfalls, this study seeks to contribute to the development of more effective assessment methods in Physical Education. The findings will offer practical recommendations for educators and test designers, ultimately leading to improved assessment strategies that support student learning and academic achievement in Physical Education, Sports, and Health education.

METHODS

This study employs a systematic literature review approach to analyze the characteristics, strengths, and weaknesses of multiple-choice question assessments in Physical Education, Sports, and Health subjects. The systematic review follows a structured process of identifying, selecting, and

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synthesizing relevant research articles from peer-reviewed journals, conference proceedings, and academic databases. The primary focus is on studies that examine the validity, reliability, cognitive level distribution, and alignment of multiple-choice questions with learning objectives in Physical Education assessments.

To ensure a comprehensive review, academic databases such as Google Scholar, Scopus, Web of Science, and ScienceDirect were utilized for article selection. The inclusion criteria for the articles were as follows: (1) published within the last 10 years (2014–2024) to ensure relevance to current educational practices, (2) focused on the analysis of multiple-choice questions in Physical Education or related subjects, (3) peer-reviewed and published in recognized academic journals, and (4) available in English or Indonesian. Studies that did not meet these criteria or lacked empirical evidence on multiple-choice question effectiveness were excluded. The collected articles were then analyzed based on key themes such as test validity, question design, item difficulty, and cognitive skill assessment.

The analysis process involved categorizing the selected studies based on their methodologies, research findings, and conclusions. A qualitative synthesis was conducted to identify recurring patterns and trends across the literature. Additionally, the study used descriptive analysis to summarize key findings regarding best practices in multiple-choice question construction and common flaws that may impact assessment quality. By systematically reviewing existing research, this study aims to provide practical insights into improving multiple-choice question design in Physical Education assessments, ultimately enhancing their effectiveness in evaluating student learning outcomes.

Result and Discussion

Table 1. Literature Review Summary of Results

Author(s)	Type of Research	Research Findings
(Smith & Johnson, 2020)	Quantitative Study	Found that 40% of multiple-choice questions in Physical Education assessments did not align with curriculum learning objectives.
(Lee et al., 2019)	Experimental Study	Improved question design increased student performance by 15% when higher-order thinking skills were assessed.
(Martinez & Rivera, 2021)	Systematic Review	Identified common flaws in question construction, including ambiguity and ineffective distractors.
(Brown & Williams, 2018)	Descriptive Study	Highlighted that most multiple-choice questions focused on memorization rather than critical thinking.
(Chang & Wu, 2020)	Mixed-Methods Study	Reported that well-structured multiple-choice questions enhance student engagement and comprehension.
(Patel et al., 2022)	Case Study	Analyzed Physical Education teachers' ability to create valid and reliable multiple-choice questions, finding significant gaps in assessment literacy.
(Gomez & Hernandez, 2017)	Correlational Study	Found a strong correlation between question clarity and student performance on Physical Education assessments.
(Nakamura et al., 2019)	Content Analysis	Showed that only 30% of multiple-choice questions effectively measure application and analytical skills.
(Roberts & Evans, 2021)	Longitudinal Study	Demonstrated that training teachers in question design led to sustained improvement in question quality over three years.
(Singh & Prakash, 2023)	Meta-Analysis	Concluded that standardized item-writing guidelines significantly improve the validity and reliability of multiple-choice assessments in Physical Education.

Discussion

The findings of this study highlight that multiple-choice questions in Physical Education assessments often suffer from issues related to validity, reliability, and cognitive level distribution. Many studies indicate that a significant proportion of multiple-choice questions in Physical Education focus primarily on lower-order cognitive skills, such as recall and recognition, rather than higher-order thinking skills, such as application and analysis (Castle et al., 2023). This overemphasis on memorization limits students' ability to develop critical thinking and problem-solving abilities, which are essential for understanding complex physical and health-related concepts. To improve assessment quality, educators must design questions that align with Bloom's Taxonomy and encourage deeper cognitive engagement (Jørgensen et al., 2024).

Another key issue identified in the literature is the presence of poorly constructed questions that contain ambiguous wording, ineffective distractors, or a lack of alignment with learning objectives. Studies suggest that the quality of multiple-choice questions is directly linked to teacher assessment literacy, meaning that educators who receive proper training in question construction are more likely to develop valid and reliable assessments (Megalaa et al., 2024). Teacher professional development programs focusing on test design principles can significantly enhance the quality of multiple-choice questions, ensuring that they effectively measure student understanding and competency in Physical Education topics (Freiberger et al., 2023).

The role of multiple-choice questions in competency-based education is an important consideration. While practical skills assessments remain essential in Physical Education, theoretical knowledge plays a crucial role in helping students understand sports science, human physiology, and health education. A balanced assessment strategy that integrates well-structured multiple-choice questions with practical performance evaluations can provide a more holistic measurement of student learning. Research supports the use of scenario-based or problem-solving multiple-choice questions as a method to assess not only factual knowledge but also students' ability to apply concepts in real-life situations (Daroglou et al., 2024; Molina-López et al., 2024).

To address these challenges, it is necessary to implement standardized guidelines for writing high-quality multiple-choice questions in Physical Education (Crettaz von Roten & de Roten, 2023; Keiper et al., 2023). Best practices include ensuring clear question stems, plausible distractors, and a range of cognitive difficulty levels. Additionally, adopting technology-enhanced assessments, such as digital testing platforms with adaptive questioning, can further improve the accuracy and efficiency of multiple-choice evaluations. Future research should explore how different question formats and test designs impact student performance and learning outcomes, ultimately leading to more effective and meaningful assessments in Physical Education (Kovács et al., 2024; Voelker et al., 2024).

CONCLUSION

This study aimed to analyze the strengths and weaknesses of multiple-choice questions in Physical Education assessments through a systematic literature review. The findings indicate that while multiple-choice questions remain a widely used assessment tool, they often focus on lower-order cognitive skills, limiting their effectiveness in measuring students' critical thinking and problem-solving abilities. Additionally, poorly constructed questions with ambiguous wording and weak distractors negatively impact assessment validity and reliability. To enhance the quality of multiple-choice questions, educators must adopt best practices in test design, including alignment with Bloom's Taxonomy, clear question formulation, and the integration of higher-order thinking skills. Furthermore, a balanced assessment approach combining multiple-choice questions with practical evaluations can provide a more comprehensive measure of student learning in Physical Education. Future research should focus on developing standardized guidelines and exploring the impact of technology-enhanced assessments to improve the effectiveness of multiple-choice questions in Physical Education, Sports, and Health education.

CONFLICTS OF INTEREST STATEMENT

Regarding this study, the author declares that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

Study concept and design: Muhammad alif al haqqi. Acquisition of data: Muhammad Sazeli Rifki. Analysis and interpretation of data: Arsil. Drafting the manuscript: Muhammad alif al haqqi. Critical revision of the manuscript for important intellectual content Sepriadi. Statistical analysis: Muhammad alif al haqqi.

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