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The impact of teacher competence on students' physical activity: a systematic review

El impacto de la competencia docente en la actividad física de los estudiantes: una revisión sistemática

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Abstract
This study is a systematic review that examines the impact of teacher competence on student participation and motivation in physical activity. The results of the review showed the mediating role of teacher support in linking learning strategies with students' active involvement in physical activities, in accordance with the theory of self-determination. Competent teachers can improve students' perceptions of competence, meet basic psychological needs such as autonomy and competence, thereby increasing students' intrinsic motivation and active engagement. In addition, teachers' digital competence, cross-cultural understanding, and the ability to manage virtual classrooms also have a significant influence on the learning process of Physical Education. Sociodemographic factors and teachers' work experience are important variables in competency development. These findings confirm the importance of improving teacher competencies, including digital skills and transcultural approaches, to support the effectiveness of Physical Education learning in the modern era
.
Keywords: teacher competence; Physical Education; physical activity; student motivation
Resumen
Este estudio es una revisión sistemática que examina el impacto de la competencia docente en la participación y motivación de los estudiantes en la actividad física. Los resultados de la revisión mostraron el papel mediador del apoyo docente en la vinculación de las estrategias de aprendizaje con la participación activa de los estudiantes en actividades físicas, de acuerdo con la teoría de la autodeterminación. Los profesores competentes pueden mejorar las percepciones de competencia de los estudiantes, satisfacer las necesidades psicológicas básicas como la autonomía y la competencia, aumentando así la motivación intrínseca y el compromiso activo de los estudiantes. Además, la competencia digital de los docentes, la comprensión intercultural y la capacidad de gestionar aulas virtuales también tienen una influencia significativa en el proceso de aprendizaje de la Educación Física. Los factores sociodemográficos y la experiencia laboral de los docentes son variables importantes en el desarrollo de competencias. Estos hallazgos confirman la importancia de mejorar las competencias de los docentes, incluidas las habilidades digitales y los enfoques transculturales, para apoyar la eficacia del aprendizaje de la educación física en la era moderna.

Palabras clave: competencia docente; Educación física; actividad física; motivación de los estudiantes

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Introduction

Teacher competency in physical activity education is crucial for fostering students' engagement, motivation, and physical fitness (Ho et al., 2023). Studies show that competent physical education teachers who provide autonomy support and adapt teaching strategies according to students' skill levels significantly enhance students' participation in sports and exercise (Miao & Ma, 2023). This support strengthens students' confidence, enjoyment, and persistence in physical activities, creating a positive learning environment that encourages ongoing engagement (Guan et al., 2023). Teacher competence not only impacts the physical skills development but also addresses students' psychological needs, promoting intrinsic motivation and a lifelong interest in physical activity (Carriedo et al., 2023).

Effective physical education teaching improves students' motor skills, cardiovascular health, flexibility, and overall well-being (Maquera-Maquera & Bermejo-Paredes, 2021). However, the implementation of physical education in schools can vary widely, with gaps in teacher preparedness, teaching approaches, and resource availability affecting outcomes (Lomsdal et al., 2022). The importance of teacher training programs that emphasize competence support, psychological encouragement, and the design of adaptable curricula tailored to diverse student needs (Pozo-Rico et al., 2023). These efforts help overcome barriers such as fear of failure and low self-efficacy, making physical education more inclusive and effective.

Competent teachers enhance students' perceived competence, which is integral to their motivation and active involvement in physical activities (Guo et al., 2023). This aligns with self-determination theory, explaining how teachers' autonomy and competence support satisfy students' basic psychological needs, leading to increased sport participation and improved physical health outcomes (Guay, 2022). Moreover, teacher competence extends beyond skill instruction to fostering emotional and social support during physical education (Guo et al., 2023). Creating a supportive climate in classes encourages students to experiment with new activities without fear of failure, thus broadening their physical competencies and confidence (Monteiro et al., 2021) . This relational and motivational support is essential in forming positive attitudes toward physical exercise that persist beyond school years.

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Overall, the impact of teacher competency in physical activity education is multifaceted, encompassing skill development, psychological empowerment, and motivational enhancement. Systematic reviews highlight the need for ongoing professional development and targeted interventions to maintain high teaching standards. As physical activity is fundamental for students' health and holistic development, improving teacher competency remains vital for nurturing active, healthy, and motivated learners.

Methodology

The preparation of this article was carried out through systematic analysis using the literature review method. A comprehensive strategy is designed to collect and evaluate research results related to the impact of teacher competency in physical activity students. This approach ensures the identification of methodologically rigorous, relevant sources, with a focus on the synthesis of the latest scientific findings. The literature search was conducted using a specific keyword combination: (TITLE-ABS-KEY (Teacher Competency) AND TITLE-ABS-KEY (Student Physical Activity)). This strategy is applied to screen documents that explicitly address the target topic. The main database used is Scopus, chosen for its multidisciplinary scope and reputation in an index of high-quality scientific works. The inclusion criteria include articles that discuss impact of teacher competence on students' physical activity as a core topic. In contrast, the exclusion criterion negates publications outside the last 10-year span (2016–2025). This time constraint ensures up-to-date evidence-based analysis, while maintaining the relevance of findings to the latest scientific context. The research limits the subject to three main areas: social sciences, health professions, and medicine. Only English-language journal articles are included in the analysis, with document types limited to Articles (not books, reports, or non-standard materials). This filtering maintains the focus and consistency of the data source. The study follows PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency and reproducibility. Each stage starts from searching, filtering, to detailed documentation synthesis to minimize bias and increase the validity of the final conclusion.

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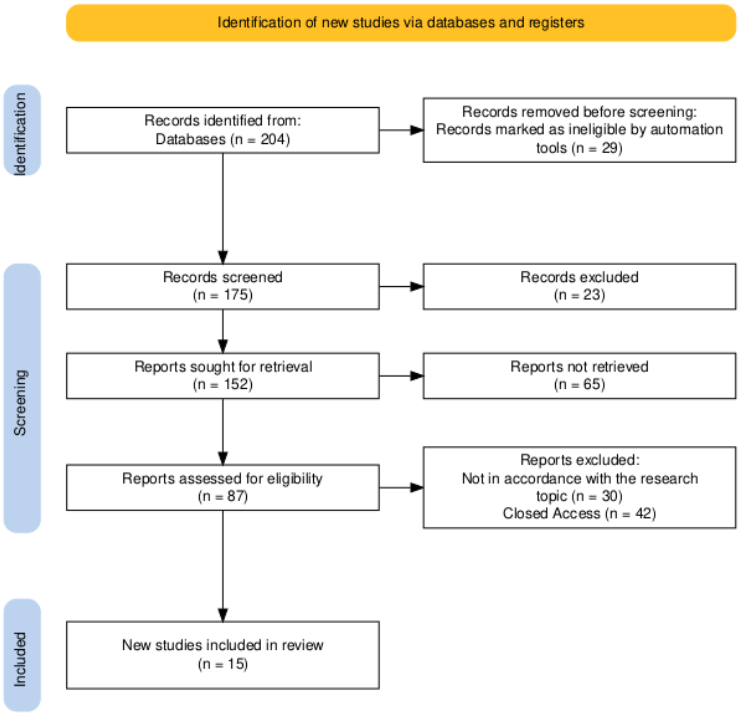

Figure 1. PRISMA flowchart of the article selection process

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Results

Table 1. Summary of review article

No.	Author	Research Objectives	Research Methods	Research Results
1	Meng & Keng (2016)	To test the impact of a teaching structure that supports autonomy on physical education (PE) students after a 10-week training program.	quantitative research	Students in the autonomy-supporting teaching structure (ASTS-PE) group showed better overall outcomes than the other two groups. They have higher fulfillment of basic psychological needs, higher motivation, higher perception of autonomy support, higher engagement, and more active during PE.
2	Winslade (2016)	To test the perceptions of Australian student-teachers taking part in international field experiences in Samoa regarding cultural competence. In particular, to find out whether international field experience can assist aspiring Physical Education and Health (HPE) teachers in developing cultural competence and whether completion of SSOP improves their understanding and awareness of cultural competence.	qualitative research	Student-teachers feel that the experience enhances their understanding of cultural awareness and helps them develop a variety of skills in working with people from other cultures. The experience increases students' awareness of cultural beliefs and values outside of their individual belief systems and helps students develop the various skills needed to work more effectively as professionals in transcultural contexts.
3	Abildsnes et al. (2017)	To examine differences in physical activity, diet, smoking habits, sleep, and screen time among Norwegian vocational high school students who choose one of two different PE models ("Sport enjoyment" or "Motion	Mix methods, quantitative and qualitative research	Students who chose "Sport enjoyment" collected more steps/day than the "Motion enjoyment" group (9167 vs. 6661 steps/day). There were no significant differences in MVPA, light physical activity, sedentary time, or sleep hours between the two groups. The average score was 3.6 for "Sport enjoyment" and 2.8 for "Motion enjoyment".

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		enjoyment"), and to explore students' experiences with PE programs.		
4	Tudor et al. (2019)	To explore the concept of common stressors in physical education (PE) lessons. This study is the first to explore the common stressors that students experience in PE.	qualitative research	Three high-level themes were identified from the data: social environment; physical and organizational environment; and performance environment. Common stressors in the social environment include: interpersonal transactions between peers; differences in the level of effort during PE; and working outside of peer groups. Stressors in the physical and organizational environment consist of the environmental situation in the changing facilities and the availability of activities. Performance environment stressors include: situations involving the acquisition of difficult physical skills; and situations in which physical appearance and physical competence are exposed.
5	Griban et al. (2021)	To synthesize, implement, and verify the efficiency of the original methodical system of physical education for students of Ukrainian higher education institutions.	Pedagogical experiments	The original methodical system applied in the educational process of experimental groups contributes to the improvement of the quality of students' physical education, forming the highly developed health and fitness competencies necessary during professional activities. The experimental group showed significant dynamics in theoretical knowledge and greater improvements in physical fitness tests than the control group.
6	McDavid et al. (2020)	To understand how students' perceptions of teacher support (autonomy, structure, engagement) predict satisfaction of psychological needs (competence, autonomy, interconnectedness) and motivational regulation (intrinsic, identified,	Survey research	The learning context (after school) is positively related to students' perceptions of autonomy and negatively to introjected and external regulation. The perception of autonomy support and teacher involvement was positively correlated with more independent motivation regulation. Support autonomy and teacher involvement also have a negative association with external regulation.

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		introjected, external) in technology-focused programs. Also to test the potential influence of the learning context (at school vs. after school).		
7	Rojo-Ramos et al. (2020)	To describe and expose the level of digital competence among physical education teachers working in the public school system in one region of Spain. In particular, to describe self-perception of competence, compare it with the General Framework of Digital Teaching Competency, and describe whether PE teachers integrate ICT in the teaching-learning process.	The descriptive study uses quantitative research methods.	Primary school PE teachers in public schools in Spain have a basic level of digital teaching competence (A2 level). Most teachers felt they had a digital competency level of B1 (38%) or B2 (34%), indicating a medium level of self-perception. However, the actual assessment shows the average Basic User Rate. Younger generations (ages 21-30) are more likely to promote the use of ICT in PE classes. 8% of teachers do not have digital teaching competence.
8	Zalech (2021)	To examine the impact of students' perceptions of PE teachers and their impact on their participation in PE classes and sports.	Questionnaire-based quantitative study	Students' perception of PE teachers that was considered most important was the teacher's communication skills and the ability to make lessons interesting and enjoyable, followed by the teacher's motor (sports) skills. These factors have a significant and positive impact on student participation in PE classes and sports.
9	Koch et al. (2021)	To evaluate the reach, effectiveness, adoption, implementation, and maintenance of compulsory physical activity in the curriculum in ten Danish schools, using the RE-AIM framework.	Design complementary mixing methods	The implementation of mandatory daily physical activity varies from school to school and is described as "partially implemented" after four years. An average of 45.2% of students achieve 45 minutes of daily PA in the curriculum. The role of school management in monitoring, prioritizing, and supporting implementation is critical. Teacher involvement is important for motivation and ownership.

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10	Valverde-Esteve et al. (2021)	To measure the postural control of children with Autism Spectrum Disorder (ASD) who participated in a 6-month service learning (SL) program compared to ASD peers in the control group.	Quasi-experimental design	The results of the experimental group showed a significant improvement in the vestibular pathway, an improvement trend in the somatosensory and visual pathways, and an improvement in the dynamic test. This study provides valuable feedback on how SL programs can benefit children with ASD to improve their postural control. Quasi-experimental design
11	Teresa et al. (2022)	To strengthen the competence of teachers in office through a training process on environmental and sustainability issues. In particular, to expand teachers' knowledge of environmental education for sustainability, sustainable development goals, and methodological strategies.	qualitative research	The training process influences the teacher's perception, achieving a more complex vision of the topic being studied. The proposed didactic and pedagogical strategies facilitate the integration of transversal activities in their disciplines. 100% of teachers have knowledge of competency-based approaches; 88% know about environmental care competencies. 81% of teachers fully agree on the need for continuous training for socio-environmental issues and that schools should develop environmental competence in students.
12	Del Valle et al. (2022)	To analyze a significant increase in the perception of teaching competence in Physical Education. In particular, to confirm how interventions with global models of teaching self-efficacy can be independent of social or cultural gender roles.	Descriptive, quantitative, correlational, and cross-sectional studies	Significant differences were observed in three of the four factors (creative potential with institutional support, didactic technical mastery, and active personality with metacognitive didactic capacity), suggesting an increased perception of teaching self-efficacy regardless of gender. There was no significant difference in the reciprocal leadership factor. Men and women showed increased perceptions in didactic technical mastery and active personalities, but men showed significant differences in creative potential.
13	Nugraha et al. (2022)	To find out students' perceptions of physical education and teaching	qualitative research	95.6% of students prefer sports, compared to 18.89% who prefer game-based physical education. Only 4.40% of students do not like sports or physical activity. Students are not motivated due to

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		difficulties in elementary schools in Yogyakarta, Indonesia.		the monotonous curriculum, repetitive material, heavy emphasis on competition, and excessive use of physical fitness tests. Teachers have difficulty in writing assessment reports (6 teachers), filling out assessment rubrics (4 teachers), and providing adequate media (8 teachers).
14	Bula-Biteniece et al. (2023)	To find out the opinions of students and teachers about the implementation of a competency-based curriculum in outdoor physical education classes.	Case study research	Teachers argue that students don't like to go out and find it difficult to apply many topics in an outdoor environment. It is important that the opinions of students and teachers are similar for the effectiveness of PE classes. Teachers' opinions on the knowledge and skills required for outdoor PE: the need for clear material and descriptions. The importance of the teacher's personality, ability to engage, and teach in the rational and affective emotional categories.
15	Işıkgöz (2024)	To investigate the competencies of physical education teachers in virtual classroom management. Also, to examine whether socio-demographic variables (gender, school level, education level, working age, online classroom experience) significantly affect teachers' online classroom management competencies.	The cross-sectional study used quantitative research methods	Physical education teachers are still in doubt about their competence in managing relationships with students in virtual classrooms. However, they are competent in the dimensions of virtual classroom activities and virtual classroom management. Gender and work experience have a moderate effect, virtual classrooms have a large effect, and school level has a weak effect on teachers' virtual classroom competencies. Education level does not significantly affect competence. Online classroom management competencies decline with the increase in professional working hours.

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Discussion

Teacher Competency and Autonomy Support in Physical Education

Research on teacher competence and autonomy support in physical education shows a significant relationship between teachers' ability to provide autonomy support and students' motivation, engagement, and physical activity Meng & Keng (2016) conducted by Meng & Keng (2016) and (McDavid et al., 2020) highlight that teaching methods that support student autonomy can meet students' basic psychological needs, especially the need for autonomy and competence, which in turn increases students' intrinsic motivation towards physical learning. For example, autonomy support-based interventions by teachers result in significant improvements in intrinsic motivation, student intention to participate in sports, and regular physical activity outside of school (Okada, 2023). A competent teacher in this regard gives students the freedom to choose, arrange exercises according to their interests and pace, and provide clear and meaningful feedback so that students feel valued and capable (Fernández-Batanero et al., 2022). Other research also showed that autonomy support from teachers was positively correlated with satisfaction of students' psychological needs and actual performance in learning physical activity (Brandisauskiene et al., 2023). Therefore, the development of teacher competencies in teaching strategies that support autonomy is essential to build sustained student motivation and engagement in physical education, as well as improve students' long-term physical learning and physical activity outcomes (Yang et al., 2022). Thus, these studies reinforce the importance of teacher training that focuses on effectively providing autonomy support as a strategic step in physical education.

Competency in Program Implementation and Curriculum Delivery

Teacher competency in implementing physical activity programs and competency-based curricula is multifaceted, encompassing preparedness, engagement, and the ability to scale and adopt curricula effectively (Töpfer et al., 2022). Research shows that teacher preparedness, including professional development and hands-on training, significantly influences their self-efficacy and attitudes toward promoting physical activity among students, which in turn impacts program success (Admiraal et al., 2023). For example, preservice teachers with positive health behaviors and prior engagement in physical activity exhibit greater confidence and enthusiasm in facilitating such programs,

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reinforcing a bi-directional relationship where healthier teachers promote healthier students. Effective teacher training often involves sustained, theory-based interventions such as autonomy-supportive teaching and motivational strategies, which enhance instructional competence and student engagement (Sims et al., 2025). Moreover, teacher engagement is crucial for curriculum adoption and scalability, as teachers who receive ongoing support and resources are better equipped to maintain and expand physical activity initiatives within schools (Nguyen et al., 2023). These themes collectively underscore the critical role of well-prepared, motivated teachers in achieving successful implementation and sustainability of physical activity programs and competency-based curricula in educational settings.

Cultural Competency and Transcultural Awareness

Research shows that teaching experiences in multicultural and international environments significantly enrich teachers' cultural competencies as well as increase student engagement. Through hands-on experience interacting with different cultures, teachers develop cultural sensitivity, self-awareness, and cross-cultural skills that are essential in managing student diversity. The experience of teaching abroad allows prospective teachers to gain the ability to navigate social and cultural variations, as well as form adequate cultural empathy in the classroom (Fang et al., 2024). Teachers' involvement in the context of multicultural teaching helps them overcome challenges such as language differences, religious sensitivities, and adaptation to different school climates, thus preparing them to become more inclusive and responsive global educators (Ruales et al., 2021). These competencies are not only concerned with knowledge alone, but also with practical attitudes and skills that arise from reflection and real experience, which ultimately positively impact student engagement and achievement in culturally diverse classrooms. Thus, the development of teachers' cultural competence through multicultural and international experiences is a key component in providing inclusive and effective education for students from diverse cultural backgrounds.

Teacher Competency in Digital and Virtual Classrooms

Physical education teachers' competency in managing virtual classrooms reveals mixed proficiency, particularly in the dimension of fostering relationships with students virtually. While teachers generally feel competent in managing virtual classroom

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activities and overall virtual classroom management, they remain uncertain about effectively engaging students in a virtual environment (Seufert et al., 2022). Socio-demographic factors influence this competency: gender and work experience show moderate effects, with male teachers and those with more years of experience demonstrating higher competence in virtual classroom activities and management (Kotherja & Hamzallari, 2022). School level has a weaker influence, where high school teachers tend to manage virtual classrooms slightly better than their secondary school counterparts, possibly due to students' higher technological literacy and responsibility at older ages (Thien & Lee, 2023). However, educational level does not significantly impact competency. Lack of virtual classroom experience is strongly associated with lower management competencies, underscoring the importance of teacher training and experience in digital literacy and virtual class management . Integrating technology in physical education teaching demands that teachers be adept not only in digital tools but also in adapting physical activity instruction to virtual platforms, requiring enhanced digital literacy and innovative pedagogical strategies (Isgren Karlsson et al., 2023). Overall, advancing teacher competencies in virtual physical education settings is essential, with targeted support addressing socio-demographic disparities and experience gaps to ensure effective virtual learning environments.

Teacher Competency and Student Perceptions/Participation

Student perceptions of teacher competency, particularly in terms of communication skills and engagement, play a crucial role in shaping their participation in physical activities. Effective communication by teachers, encompassing verbal and non-verbal strategies such as active listening, clear content delivery, body language, and emotional expression, fosters a supportive and engaging learning environment that encourages student involvement. When students perceive their teachers as competent, credible, and capable of creating a positive atmosphere and stimulating two-way communication, their motivation and participation in physical activities, including physical education and sports, tend to increase (Ghulam Mujtaba Yasir et al., 2023). Studies indicate that teachers' interpersonal skills and ability to conduct attractive, inclusive, and varied classes significantly influence students' attitudes and engagement levels (Ayasrah et al., 2023). Therefore, improving teacher competencies in communication and student engagement

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can lead to higher student participation in physical activities, promoting not only physical fitness but also social and emotional development among students (Caires et al., 2023). This relationship highlights the importance of teacher training focused on communication and engagement strategies to enhance students' active involvement in physical education settings.

Teacher Competency in Specialized Educational Contexts

Teachers' competency in specialized educational contexts, such as teaching children with Autism Spectrum Disorder (ASD) or supporting students with special needs in inclusive settings, is critical for effective educational outcomes. Teachers must possess a combination of cognitive, professional, and personal competencies tailored to the unique needs of these students (Romijn et al., 2021). For instance, educators working with children with ASD need specialized training to develop socio-educational skills that enhance communication, socialization, and adaptive learning strategies, as these children face distinct challenges that differ from typical classrooms (Aruldass et al., 2022). Competency areas include understanding the characteristics of students with special needs, adapting instructional methods and materials, managing classroom dynamics inclusively, and employing empathy and commitment to student rights (Skura & Świderska, 2022). Furthermore, teachers' abilities to create inclusive learning environments depend on their mastery of pedagogical skills, curriculum adaptation, lesson planning, and continuous professional development (Woodcock & Hardy, 2023). Teacher competencies in these domains not only facilitate better educational participation for children with special needs but also contribute to their social inclusion and overall development, underscoring the importance of ongoing specialized training and reflective practice for educators in specialized contexts (Majoko, 2019). This integrated competency framework supports inclusive education by ensuring educators can address diverse learning barriers effectively and foster an equitable learning environment.

Challenges and Development Needs in Teacher Competency

Teachers face several significant difficulties in implementing the curriculum, particularly in areas such as curriculum understanding, assessment, and resource provision, highlighting the necessity for ongoing professional development. Teachers struggle with a limited understanding of new curriculum concepts, inadequate practical

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training, and the challenge of adapting to student-centered learning approaches issues that often result in reliance on traditional teaching methods (Varas et al., 2023). Additionally, constraints related to insufficient school resources, technological limitations, and time management impact their ability to effectively implement learning activities and assessments (Timotheou et al., 2023). Teachers also report challenges in developing appropriate lesson plans, learning materials, and authentic assessment formats (Wahyuningsih et al., 2021). These difficulties are compounded by increased administrative burdens and cultural resistance to change. To overcome these obstacles, studies emphasize the critical role of continuous, practical, and hands-on professional development that aligns with teachers' real classroom needs, alongside stronger institutional support such as resource provision, mentoring, and policy adjustments (Abakah, 2023). Such efforts are essential to empower teachers as facilitators, curriculum developers, and evaluators, ultimately enhancing educational outcomes and the meaningful implementation of curriculum reforms like the Merdeka or Independent Curriculum in Indonesia. This ongoing professional growth is vital for teachers to confidently adapt to innovation and improve their pedagogical competence in a dynamic educational landscape.

Effectiveness of Teacher Competency on Student Outcomes

Empirical studies on the effectiveness of teacher competency consistently demonstrate a positive impact on various student outcomes, including health, fitness, motivation, and learning. For instance, Teacher competence encompassing pedagogical content knowledge, self-efficacy, and teaching enthusiasm significantly enhances students' interest and achievement, with teaching quality acting as a key mediator in this relationship (Fauth et al., 2019). Effective teacher competencies translate into quality classroom interactions such as cognitive activation, supportive climate, and classroom management, which are crucial for student motivation and learning gains (Kaendler et al., 2015). Moreover, teacher competency is linked not only to improved academic performance but also to broader aspects of student well-being and social development, including emotional health and motivation to engage in physical activity (Dumaguing & Yango, 2023). These findings highlight the critical role of teacher skills and behaviors in fostering an environment conducive to both cognitive and non-cognitive student

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outcomes, supporting the need for targeted professional development initiatives to strengthen teacher competencies in order to maximize student success across multiple domains. This synthesis of experimental and quasi-experimental research underscores the multifaceted influence of teacher competency on optimizing student health, fitness, motivation, and learning outcomes.

Future research recommendations

Based on the findings in a systematic review of the impact of teacher competence on students' physical activity, there are several important recommendations for future research. Further research is suggested to expand the geographical and cultural context, including more developing countries and minority groups, to make the results more generalizing. In addition, there needs to be a more in-depth exploration regarding the influence of interaction between teachers' digital competencies and the success of technology-based physical education learning, especially in the era of online learning. Quantitative and qualitative research involving longitudinal design can provide a more comprehensive picture of the long-term effects of teacher competency interventions. The development of valid and reliable teacher competency measurement tools is also a priority, to support accurate evaluation. Finally, the research needs to pay attention to aspects of continuous training for teachers as well as cross-disciplinary collaboration to implement innovations in physical education learning, so as to be able to optimally increase student motivation, participation, and health.

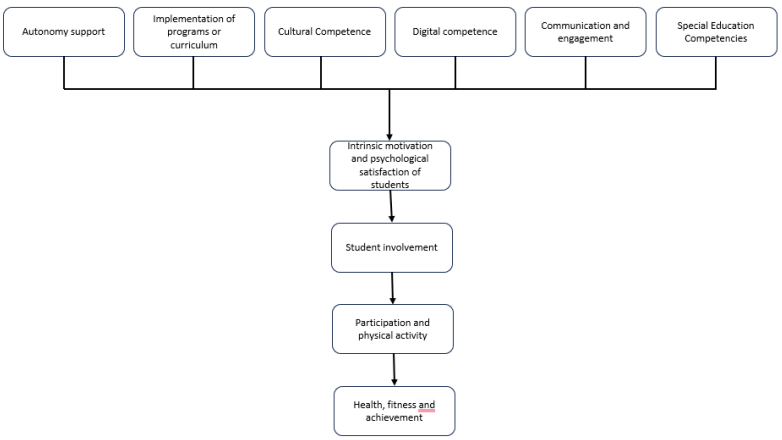

figure 2. Research framework impact of teacher competency in physical activity student

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Conclusion

Teacher competence plays an important role in shaping student involvement, motivation, and learning outcomes in physical education and physical activity. Teachers who are competent in pedagogical aspects, communication, motivational strategies, and digital technology are able to meet the psychological needs of students, encourage intrinsic motivation, and increase active student participation. Teaching approaches that support student autonomy, as well as teachers' ability to present fun learning, have been shown to increase students' positive physical activity engagement and behavior. In addition, effective classroom management and teachers' ability to create a conducive social environment also contribute to stress reduction and improved student well-being. Therefore, systematic training and support for teacher competency development is needed to optimize physical education outcomes and improve students' overall physical and psychological health.

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