
Enhancing Physical Education through Comprehensive Evaluation and Development: A Survey

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Abstract

This comprehensive survey paper investigates the strategic initiatives aimed at enhancing physical education (PE) through a multi-faceted approach. Central to this initiative is the evaluation of post-service training quality for PE teachers, the implementation of a system to assess the Health-First Curriculum Standards, and the development of a scale for competency-based teacher training. The paper also explores the establishment of a feedback mechanism for sports and health curriculum policy and the promotion of teacher professional development through competency-based education aligned with updated PE curriculum standards. The survey is organized into ten sections, each addressing critical aspects of these initiatives. Key findings highlight the potential of competency-based education (CBE) in fostering personalized learning pathways, promoting lifelong physical activity, and enhancing student engagement through the integration of mindfulness, motivation, and meaning. The paper underscores the necessity of a comprehensive evaluation system that integrates both quantitative and qualitative methods to ensure accurate assessments of PE quality. Future research directions include the development of comprehensive training programs for PE teachers, particularly in Project-Based Learning (PBL), and the exploration of strategies for professional development and infrastructure enhancement to support effective curriculum implementation. The survey concludes with an emphasis on the importance of addressing current health crises among students through urgent policy changes and targeted interventions, advocating for the integration of psychological theories with empirical studies to better understand and influence physical activity behaviors.

1 Introduction

1.1 Strategic Initiatives in Physical Education

Strategic initiatives to enhance physical education adopt a holistic approach that encompasses evaluation, development, and innovative pedagogical methods. Central to these efforts is the 'Health First' concept, which prioritizes students' physical and mental well-being, addressing shortcomings in traditional curricula [1]. This aligns with national educational objectives under the 'Healthy China 2030' strategy, which emphasizes health promotion as a key priority [2].

Physical literacy has emerged as a fundamental aspect of physical education, significantly improving student engagement and health outcomes [3]. By nurturing a physically literate populace, educational institutions can foster environments that promote lifelong physical activity and well-being [4].

The integration of fitness technology represents another strategic initiative, targeting knowledge gaps in behavior change techniques to encourage physical activity among sedentary adults [5]. These technological innovations enable physical education programs to provide personalized interventions tailored to diverse participant needs.

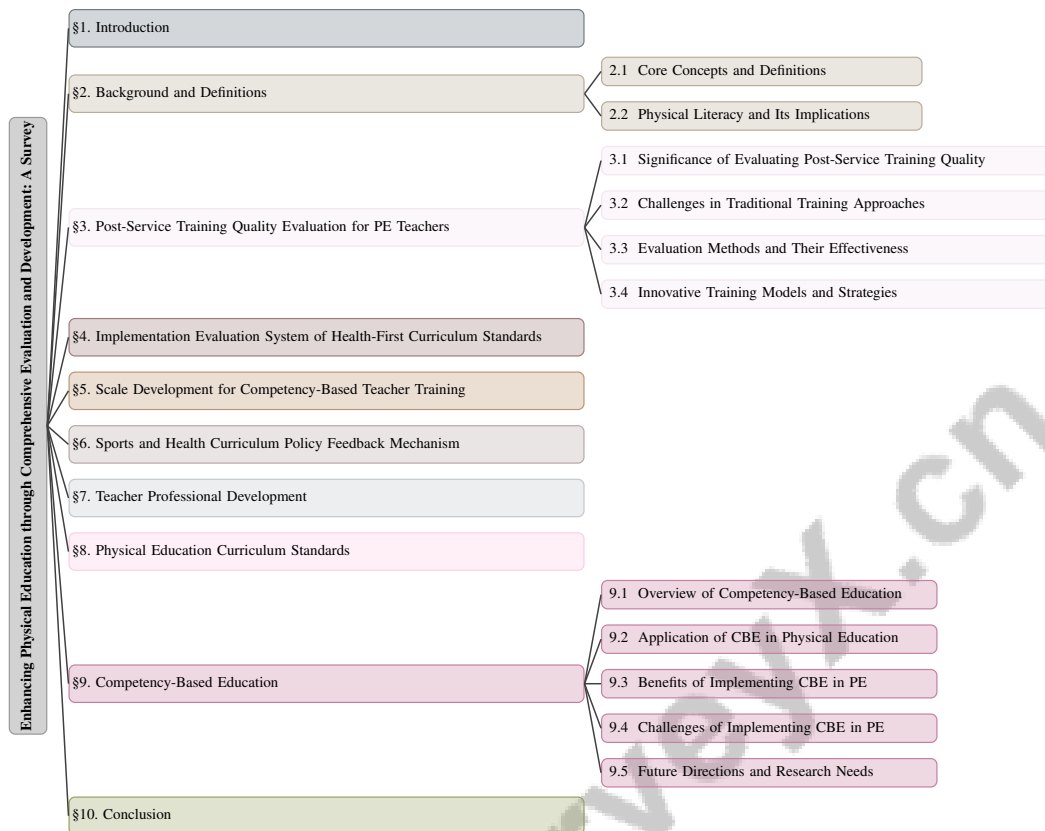


Figure 1: chapter structure

Moreover, integrating physical education with core academic subjects elucidates the connection between physical activity and academic achievement, enriching the educational experience and offering effective strategies for incorporating physical activity into the curriculum [6].

A comprehensive review of the social and political contexts shaping Chinese school physical education under the 'Health First' ideology reveals the policies and practices influencing this field [7]. Additionally, Project-Based Learning (PBL) emerges as a transformative strategy that addresses existing knowledge gaps and enhances pedagogical applications in physical education [8].

Addressing obstacles to promoting lifelong physical activity is another essential initiative, focusing on enhancing mindfulness, motivation, and meaning in physical education [9]. The establishment of a robust monitoring management mechanism and a quality evaluation index system for university physical education aims to improve management and evaluation practices, ensuring ongoing enhancement [10].

Lastly, the SAAFE delivery principles offer an evidence-based framework for planning, delivering, and evaluating organized physical activity sessions across various settings, further bolstering the development of effective physical education programs [11].

1.2 Structure of the Survey

This survey is structured into ten comprehensive sections, each addressing critical aspects of enhancing physical education through strategic initiatives. The introductory section highlights the significance of integrating evaluation and development initiatives within physical education, emphasizing the 'Health First' concept and its alignment with national health strategies. The survey then provides background and definitions, detailing core concepts such as post-service training quality evaluation, competency-based education, and teacher professional development.

Subsequent sections evaluate post-service training quality for PE teachers, discussing the importance of assessment, challenges in traditional methods, and innovative training models [10]. The implemen-

tation evaluation system of health-first curriculum standards is examined, focusing on alignment with educational goals and the integration of health education into physical education [7].

The survey further investigates the development of a scale for competency-based teacher training, defining necessary competencies and qualifications for effective teaching, alongside the ecological dynamics involved [8]. An analysis of feedback mechanisms for sports and health curriculum policies highlights the importance of diversified feedback approaches and student input in curriculum improvement [11].

Additionally, the survey addresses teacher professional development, identifying current challenges and proposing enhancement strategies through competency-based education [9]. A review of physical education curriculum standards evaluates their current effectiveness and the impact of evolving standards on teaching practices and student outcomes [6].

Finally, the survey presents an overview of competency-based education within physical education, discussing its applications, benefits, challenges, and future research directions. The concluding section summarizes key findings and implications, underscoring the necessity of comprehensive evaluation and development in advancing physical education. The following sections are organized as shown in Figure 1.

2 Background and Definitions

2.1 Core Concepts and Definitions

Understanding competency-based education (CBE) and the health-first curriculum is crucial for enhancing physical education through strategic initiatives. CBE prioritizes skill acquisition over traditional time-based progression, enabling personalized learning where students advance upon demonstrating mastery, fostering an inclusive educational environment [12]. In physical education, CBE is essential for developing tailored training programs that address diverse learner needs, promoting equity and inclusivity [13].

The health-first curriculum emphasizes students' physical and mental well-being, aligning with broader educational goals to promote holistic health. Initiatives like 'Healthy China 2030' underscore the integration of health education with physical activity to counter declining fitness levels and rising juvenile diseases such as obesity and cardiovascular issues [2]. This framework aims to create curricula that nurture a physically literate population capable of sustaining lifelong health and fitness [3].

Physical literacy involves engaging in various activities with confidence and competence, encompassing motivation, physical competence, and the knowledge to maintain lifelong physical activity [4]. It is crucial for fostering active lifestyles and improving health outcomes, particularly in addressing low activity levels among children and adolescents [11].

Evaluating teaching and learning processes, such as those in the PJOK curriculum, requires comprehensive assessments of context, input, process, and product to ensure alignment with educational outcomes and facilitate continuous improvements in physical education quality. However, challenges in defining and assessing 'ability' can lead to inequities in student evaluations [14].

Addressing challenges faced by physical educators, particularly those working with students with disabilities, requires clear definitions of the qualifications and competencies necessary for effective teaching. Competencies in human development, motor behavior, exercise science, and instructional design are critical for adapted physical educators to meet diverse learner needs [15]. These competencies enable educators to deliver inclusive and impactful programs while addressing psychological factors influencing physical activity behavior, despite the complexities of these factors [16].

2.2 Physical Literacy and Its Implications

Physical literacy, while pivotal, remains ambiguously defined within physical education, complicating its application and assessment [3]. The lack of a universally accepted definition leads to inconsistencies in educational outcomes [3]. Nonetheless, it is increasingly recognized for its potential to enhance health outcomes by fostering sustained engagement in physical activity [17].

The connection between physical literacy and health underscores the need for comprehensive educational frameworks that focus on acquiring skills necessary for lifelong physical activity [17]. However, curricula centered on physical literacy often face challenges due to insufficient moderate to vigorous physical activity (MVPA) during secondary school PE lessons, which frequently fall short of recommended guidelines [18]. This gap necessitates innovative strategies to boost physical activity levels, potentially through classroom-based interventions that also enhance academic outcomes [19].

Current pedagogical approaches to fostering physical literacy are categorized into mindfulness, motivation, and meaning [9]. Mindfulness involves cognitive engagement, encouraging students to be present during physical activities. Motivation includes intrinsic and extrinsic factors driving participation, while meaning relates to the personal relevance and value of physical activity in students' lives [9].

Teachers play a vital role in promoting physical literacy by emphasizing student enjoyment and health-related fitness, though they often face challenges such as limited access to technology and difficulties in effective instruction [20]. The automatic assessment of action quality in contexts like Olympic sports exemplifies the broader challenge of evaluating physical literacy, where performance is scored based on execution and difficulty [21]. Addressing these challenges necessitates a structured understanding of the psychological determinants of physical activity, which significantly influence students' engagement and performance in physical education [16].

3 Post-Service Training Quality Evaluation for PE Teachers

Category	Feature	Method
Innovative Training Models and Strategies	Student-Centered Learning	PRACT[22]

Table 1: Summary of innovative training models and strategies in post-service education for physical education teachers, highlighting student-centered learning approaches and the PRACTIS method. The table illustrates how these methodologies contribute to enhancing pedagogical effectiveness and aligning educational practices with health promotion strategies.

The evaluation of post-service training for physical education (PE) teachers is crucial for enhancing PE program quality. This process equips educators with the necessary skills and knowledge for effective teaching, aligning educational outcomes with contemporary health promotion strategies. As depicted in ??, the figure illustrates the hierarchical structure of key concepts related to the evaluation of post-service training quality for PE teachers. It encompasses various elements, including significance, challenges, evaluation methods, and innovative strategies. Furthermore, Table 1 presents a concise overview of innovative training models and strategies employed in post-service training for physical education teachers, emphasizing the role of student-centered learning and the PRACTIS method in improving teaching effectiveness. Additionally, Table 3 offers a detailed comparison of the frameworks, strategies, and evaluation methods employed in post-service training for physical education teachers, illustrating the critical components necessary for improving teaching effectiveness and aligning with health promotion strategies. This visual representation underscores the importance of aligning education with health promotion strategies, addressing traditional training challenges, and incorporating innovative models to enhance teaching effectiveness and promote lifelong physical activity.

3.1 Significance of Evaluating Post-Service Training Quality

Evaluating post-service training quality is vital for improving pedagogical effectiveness and ensuring education aligns with health promotion strategies [2]. Traditional training often focuses on skill acquisition, overlooking holistic health development, which can impede lifelong physical activity goals [1, 4]. Inconsistencies in certification and a shortage of qualified teachers exacerbate educational disparities, especially for students with disabilities. National standards for adapted physical education call for consistent training and certification, with competency-based education (CBE) models providing tailored support to address these disparities [15, 12, 23].

Current evaluation methods incorporate behavior change techniques, such as goal setting and feedback, to promote physical activity [5]. These methods assess the impact of training on teachers' ability to engage students in physical activity, aligning with health recommendations for moderate to

vigorous physical activity (MVPA) during PE lessons [18]. Classroom-based physical activity integration positively influences on-task behavior and academic achievement, highlighting the need for comprehensive training that enhances student progress. However, challenges such as teacher resistance to new models and resource scarcity persist [8].

Evaluating post-service training also involves examining traditional notions of ability in PE that may marginalize some students, necessitating inclusive practices [14]. Identifying gaps in teacher training is crucial for improving educational outcomes and promoting equity in PE programs. Bridging the gap between research and practice in physical activity interventions is essential, as effective interventions often lack real-world adoption [22]. A coordinated approach is needed to enhance school physical education and align it with health promotion strategies for improved student health [2].

As illustrated in Figure 2, the hierarchical structure of evaluating post-service training quality encompasses key areas such as pedagogical effectiveness, evaluation methods, and inclusive practices. Each category addresses significant challenges and strategies in aligning education with health promotion strategies, thereby reinforcing the importance of a comprehensive evaluation framework.

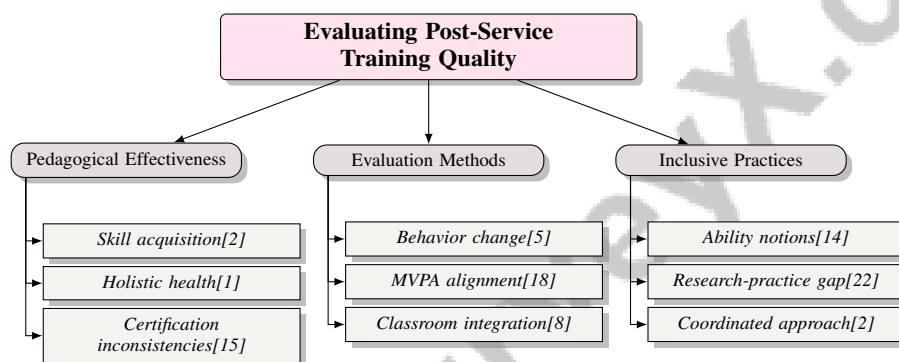


Figure 2: This figure illustrates the hierarchical structure of evaluating post-service training quality, highlighting key areas such as pedagogical effectiveness, evaluation methods, and inclusive practices. Each category addresses significant challenges and strategies in aligning education with health promotion strategies.

3.2 Challenges in Traditional Training Approaches

Traditional PE training methods face challenges that hinder program effectiveness. The ambiguous definition of physical literacy complicates educational frameworks, impeding a unified approach [3]. Outdated seat-time policies obstruct competency-based education, which favors personalized learning over time-based progression [12]. Limited teaching materials and facilities further impact curriculum delivery [24]. Teacher competency variability affects instructional quality, with institutional barriers and personal beliefs complicating effective PE program implementation [18].

Integrating physical activity within academic lessons poses challenges, balancing activity needs with curriculum constraints [25]. Sport and health discourses in assessments can marginalize students lacking certain abilities [14]. Remote teaching has highlighted technology access issues and teachers' unpreparedness for remote instruction, complicating student engagement assessment [20]. Research design variability and lack of objective physical activity measures complicate intervention assessments [19].

Innovative solutions, such as CBE, enhance personalized learning by allowing progression based on skill mastery, addressing the limitations of traditional K-12 models. This approach fosters an inclusive environment supporting individual growth, preparing students for an evolving economy. State policies promoting learning flexibility and innovation are crucial for educational transformation [12, 23]. Enhancing technology access and resources can improve remote learning, while comprehensive frameworks integrating physical literacy ensure consistency in educational objectives.

Benchmark	Size	Domain	Task Format	Metric
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Table 2: This table provides an overview of representative benchmarks used in the evaluation of post-service training quality for physical education (PE) teachers. It includes details on the size, domain, task format, and metric of each benchmark, offering insights into their applicability and effectiveness in assessing various aspects of PE training.

3.3 Evaluation Methods and Their Effectiveness

Evaluating post-service training quality for PE teachers is essential for effective teaching and educational outcomes. Various methods provide insights into program effectiveness. The CIPP evaluation model—Context, Input, Process, and Product—offers a comprehensive framework for assessing PJOK curriculum implementation [24]. This model facilitates alignment with desired outcomes and continuous improvement.

Formative and summative evaluations are crucial for assessing teaching quality. Formative evaluations provide ongoing feedback, allowing real-time teaching adjustments [10]. Summative evaluations assess training program effectiveness upon conclusion, offering a comprehensive overview of their impact [10]. Innovative approaches, like C3D feature utilization for action quality assessment in sports, highlight the potential for technology-driven evaluations [21].

Table 2 offers a comprehensive overview of the benchmarks employed to evaluate the quality of post-service training for PE teachers, highlighting their size, domain, task format, and metric. Challenges persist in defining and measuring psychological determinants of physical activity and their interactions [16]. Addressing these challenges requires integrating multiple evaluation strategies for holistic training quality assessment. Effective evaluation methods provide actionable insights, fostering continuous improvement and adapting to educators' and students' evolving needs. By integrating traditional and innovative methods, institutions can enhance post-service training quality for PE teachers, improving PE programs and promoting lifelong physical activity. Evidence-based instructional models, such as Project-Based Learning (PBL), can transform student learning experiences and align PE with broader educational initiatives. Transformative PE practices cultivate cognitive decision-making and self-motivation, making physical activities relevant and engaging. Reforming evaluation systems and teaching methodologies allows institutions to meet evolving student needs, contributing to a healthier, more active society [19, 8, 6, 9, 10].

3.4 Innovative Training Models and Strategies

Innovative training models and strategies are crucial for improving post-service training quality for PE teachers, addressing existing challenges, and fostering effective teaching practices. Project-Based Learning (PBL), aligned with constructivist learning theories, emphasizes student-centered environments. PBL encourages meaningful projects integrating physical education with broader goals, promoting critical thinking and problem-solving [8]. This approach enhances student engagement and supports essential competencies for effective teaching in diverse settings.

Frameworks utilizing C3D features for action quality assessment represent significant innovation in evaluating PE teaching practices. These frameworks provide objective measures of skill acquisition, offering insights into training program effectiveness and innovative teaching strategies [21]. Technology-driven evaluations enable educators to refine instructional methods to meet students' evolving needs.

A framework categorizing competencies into 15 standards, covering aspects of adapted physical education, emphasizes addressing diverse learner needs. This includes competencies related to human development, ethics, and instructional design, ensuring educators deliver inclusive and impactful PE programs [15]. Focusing on these competencies better prepares teachers to address challenges faced by students with disabilities, promoting equity in physical education.

Future research should prioritize developing and testing transformative PE curricula emphasizing mindfulness, motivation, and meaning. This focus on holistic education enhances student well-being and fosters lifelong physical activity engagement [9]. Strategies for improving facility management, increasing teacher training, and exploring partnerships with external sports organizations can enhance after-school programs, providing valuable student development opportunities [26].

The PRACTIS guide outlines structured steps for planning and scaling physical activity interventions, offering a practical framework for educators and policymakers to enhance PE programs [22]. By integrating innovative models and strategies, educational institutions can improve post-service training quality for PE teachers, advancing physical education and promoting lifelong health and fitness.

Feature	Significance of Evaluating Post-Service Training Quality	Challenges in Traditional Training Approaches	Evaluation Methods and Their Effectiveness
Evaluation Framework	Competency-based Education	Competency-based Education	Cipp Model
Innovative Strategy	Goal Setting Feedback	Personalized Learning Models	Technology-driven Evaluations
Focus Area	Pedagogical Effectiveness	Inclusive Practices	Program Effectiveness

Table 3: This table provides a comparative analysis of various frameworks and strategies used to evaluate post-service training quality for physical education teachers. It highlights the significance of competency-based education, the challenges associated with traditional training approaches, and the effectiveness of different evaluation methods, including the CIPP model and technology-driven evaluations. The table underscores the importance of aligning educational practices with health promotion strategies to enhance pedagogical effectiveness and promote lifelong physical activity.

4 Implementation Evaluation System of Health-First Curriculum Standards

4.1 Implementation of Health-First Curriculum

The Health-First Curriculum in physical education is designed to prioritize student engagement and health outcomes, aligning with educational objectives. This curriculum supports environments that foster physical and psychological health, structured within a tripartite framework focusing on physical health, psychological well-being, and social adaptation [2, 4]. The variability in moderate to vigorous physical activity (MVPA) levels across schools highlights the need for consistent implementation strategies, categorizing physical activity into active breaks, curriculum-focused active breaks, and physically active lessons to integrate physical activity into the school day effectively [11].

As illustrated in Figure 3, the hierarchical structure of the Health-First Curriculum emphasizes its framework components, implementation strategies, and evaluation methods. This visual representation serves to enhance our understanding of how these elements interconnect and function synergistically to promote student health and engagement.

Integrating academic subjects into physical education is crucial for enriching educational experiences and achieving broader educational goals. Current research underscores the importance of embedding physical activity within academic lessons, guided by empirical evidence and educational outcomes [21]. The PRACTIS guide emphasizes early stakeholder engagement and proactive planning to overcome potential barriers, ensuring successful implementation across diverse contexts [11].

The evaluation system for the Health-First Curriculum is adaptive, utilizing feedback from students and long-term teacher assessments to remain responsive to the evolving needs of students and educators. This dual approach fosters environments prioritizing holistic well-being, aligning with the 'health first' philosophy [7, 24]. Ultimately, the curriculum effectively aligns with educational objectives, promoting student health and well-being and encouraging lifelong physical activity.

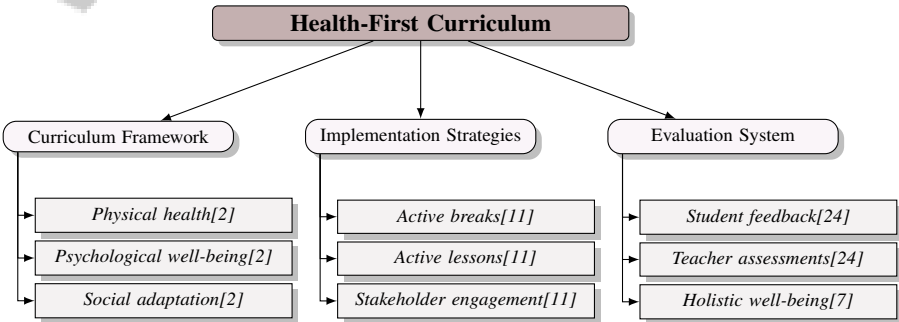


Figure 3: This figure illustrates the hierarchical structure of the Health-First Curriculum, highlighting its framework components, implementation strategies, and evaluation methods.

4.2 Frameworks and Models for Evaluation

Evaluating the Health-First Curriculum necessitates a comprehensive approach incorporating diverse frameworks and models to ensure effective implementation and alignment with educational objectives. A shift from a narrow focus on physical fitness to an integrated approach that includes character education and personal development is evident in educational policies, requiring evaluation models that reflect the curriculum's complexity [7]. Current methods categorize academic-related outcomes into classroom behavior, cognitive function, and academic achievement, facilitating assessment of the curriculum's impact on students [19].

A diversified approach to monitoring methods is advocated to capture the curriculum's complexity, ensuring evaluations are comprehensive and reflective of diverse educational contexts [10]. The PRACTIS guide provides a structured methodology for implementing and scaling physical activity interventions, supporting evaluations that are contextually relevant and responsive to unique educational settings [22].

By employing established frameworks and models, educators and policymakers can conduct thorough evaluations, ensuring alignment with educational objectives and fostering comprehensive student development encompassing physical health, mental well-being, and social adaptability. This approach is crucial for advancing holistic education, as emphasized in the 'health first' ideology, which aims to enhance students' moral, intellectual, and physical growth [1, 7]. Comprehensive evaluations support the ongoing enhancement of physical education programs, promoting lifelong health and well-being.

4.3 Integrating Health Education into Physical Education

Integrating health education into physical education is pivotal for promoting comprehensive student well-being and fostering lifelong physical activity engagement. This approach aligns with the Health-First Curriculum's broader educational goals, emphasizing both physical and psychological health [2]. By embedding health education within physical education programs, schools can cultivate holistic learning environments addressing students' multifaceted needs.

This integration enhances students' understanding of the relationship between physical activity and health, equipping them with knowledge for informed health decisions [4]. It also supports the development of physical literacy, encompassing motivation, competence, and knowledge necessary for lifelong physical activity [3]. Furthermore, it enhances student engagement by making learning experiences relevant and meaningful, improving both physical fitness and overall health [17].

Integrating health education facilitates the development of critical life skills, such as goal setting and decision-making, essential for maintaining a healthy lifestyle. Innovative pedagogical approaches, like Project-Based Learning (PBL), encourage students to explore real-world health issues and develop practical solutions [8]. By adopting a holistic approach, schools can enhance educational experiences, foster lifelong healthy habits, and contribute to national public health objectives, aligning with initiatives like "Healthy China 2030" and the evolving 'health first' ideology [9, 7, 2].

5 Scale Development for Competency-Based Teacher Training

5.1 Defining Competencies and Qualifications

In competency-based education (CBE), defining competencies and qualifications is essential for effective physical education (PE) teaching, emphasizing personalized learning and mastery-based progression [12]. Understanding skills, competence, proficiency, and qualifications is crucial for developing educational frameworks [23]. In PE, competencies include the skills and knowledge educators need to promote physical activity among diverse students.

CBE frameworks emphasize student empowerment, mastery-based progression, and equity-focused strategies, tailoring educational experiences to individual needs [12]. This approach fosters inclusive environments, allowing progression upon demonstrating competency mastery [13]. Effective PE teaching requires competencies in human development, motor behavior, exercise science, and instructional design to adapt teaching methods for diverse learners [13]. PE teachers must create engaging environments that motivate lifelong physical activity and well-being.

Educational institutions can develop specialized training programs by outlining essential PE teaching competencies and qualifications, equipping educators with necessary skills to meet contemporary demands. This includes adherence to national standards covering competencies in human development, motor behavior, exercise science, and curriculum development, ensuring PE teachers foster inclusive environments and use innovative approaches like Project-Based Learning (PBL) [15, 8]. Such training enhances educators' abilities to meet diverse needs, aligning PE with broader educational initiatives and improving student outcomes and physical activity participation.

5.2 Framework for Competency Standards

A well-defined framework for competency standards in teacher training is crucial for effective PE program development, aligning with CBE's goals of personalized learning and mastery-based progression [12]. This framework categorizes essential PE teaching skills and knowledge into pedagogical knowledge, content expertise, and professional skills. Pedagogical knowledge includes instructional strategies and classroom management techniques [23]. Content expertise involves understanding exercise science, motor behavior, and human development to design effective curricula [13]. Professional skills encompass reflective practice, collaboration, and adaptability to diverse contexts, ensuring educators meet all students' needs.

The framework promotes continuous professional development, encouraging lifelong learning and skill enhancement, consistent with CBE principles advocating ongoing assessment and feedback [12]. This fosters a culture of continuous improvement, ensuring PE teachers remain responsive to evolving standards and student needs.

As illustrated in Figure 4, the framework for competency standards in teacher training is categorized into pedagogical knowledge, content expertise, and professional skills. This figure highlights key components such as instructional strategies, exercise science, and reflective practice, aligning with competency-based education goals to enhance physical education programs.

Equity-focused strategies are integral to promoting inclusivity and diversity in PE programs, including culturally responsive teaching and inclusive curricula accommodating diverse backgrounds and abilities [13]. Prioritizing equity ensures access to high-quality education for all students. This framework serves as a comprehensive guide for educators to enhance practices and advance physical education. By adhering to CBE principles, it fosters skilled PE teachers trained to implement innovative strategies that enhance students' physical competencies and encourage lifelong physical activity engagement, transforming attitudes toward physical activity and fostering meaningful connections [11, 19, 8, 23, 9].

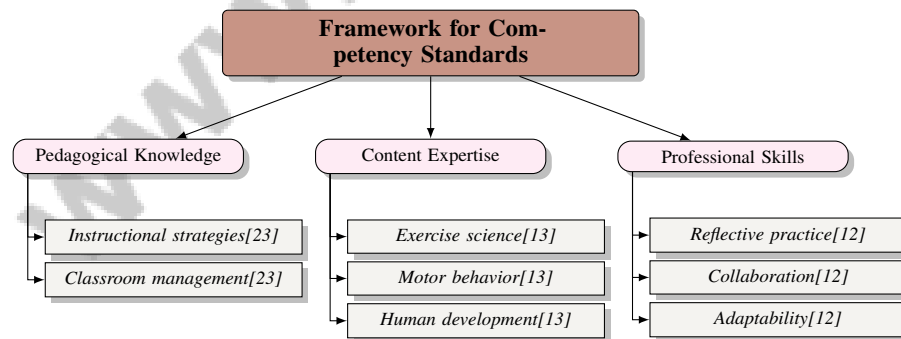


Figure 4: This figure illustrates the framework for competency standards in teacher training, categorized into pedagogical knowledge, content expertise, and professional skills. It highlights key components such as instructional strategies, exercise science, and reflective practice, aligning with competency-based education goals to enhance physical education programs.

5.3 Ecological Dynamics in Competency-Based Training

Ecological dynamics significantly influences pedagogical approaches and teacher development in competency-based training for PE teachers. This framework emphasizes creating varied learning environments supporting movement skill self-organization, fostering adaptive teaching practices

[4]. By focusing on ecological dynamics, educators can design programs encouraging real-world competency development, integrating theoretical knowledge with practical application.

Ecological dynamics emphasizes experiential learning and problem-solving, aligning with CBE principles prioritizing skill mastery and contextual application over traditional metrics [9, 12, 23, 13]. Dynamic learning environments enable teachers to understand the interplay between individual, task, and environmental constraints, adapting methods for diverse needs.

The impact of ecological dynamics on teacher development is profound, promoting a holistic view of teaching and learning. By examining educational ecosystem relationships, teachers can devise strategies enhancing student engagement and motivation, fostering a lifelong commitment to physical activity and personal growth [9, 8, 4, 3]. This perspective also cultivates critical thinking and decision-making skills essential for contemporary challenges.

Furthermore, ecological dynamics encourages integrating technology and innovative pedagogical tools, enhancing training effectiveness. Digital platforms create interactive, immersive experiences supporting movement skill development and physical literacy. This approach enhances teacher competency, equipping educators with strategies for fostering student engagement and advancing physical education through transformative practices emphasizing cognitive decision-making, self-motivation, and personal relevance, preparing students for lifelong physical activity and improving academic achievement [6, 9].

Integrating ecological dynamics into competency-based training provides a robust framework enhancing professional development and significantly improving student engagement and learning outcomes. This approach emphasizes fostering physical literacy through enriched environments, enabling teachers to facilitate meaningful participation in activities and promote lifelong health and well-being among students. By shifting from traditional methods to an ecological perspective, educators can better support functional movement skill development, addressing concerns of physical inactivity and associated health risks [9, 8, 4, 23]. Embracing this dynamic approach enhances instructional practices and promotes lifelong physical activity and well-being among students.

6 Sports and Health Curriculum Policy Feedback Mechanism

6.1 Diversified Feedback Approaches

Exploring diversified feedback approaches is vital for the continuous enhancement of sports and health curriculum policies. Curricula adhering to the 'Health First' concept significantly improve student engagement and health outcomes compared to traditional methods [1]. This underscores the importance of feedback mechanisms prioritizing health-focused educational goals. Technology-based platforms effectively gather real-time feedback from students and educators, collecting critical data on engagement, learning outcomes, and satisfaction levels. Such insights are invaluable for curriculum developers and policymakers aiming to refine educational strategies and learning environments [3, 9]. By leveraging technology, educators can obtain comprehensive feedback reflecting diverse student needs, guiding necessary curriculum adjustments.

Traditional feedback methods, such as surveys, focus groups, and interviews, remain essential for qualitative insights. Engaging various stakeholders—students, teachers, parents, and community members—ensures feedback represents the educational community, shaping inclusive and responsive curriculum policies. This collaborative approach is crucial for fostering a competency-based education model that addresses unique learner needs, especially in response to systemic educational challenges. Diverse perspectives enable educational leaders to formulate policies promoting equity and adaptability, enhancing student success in a rapidly evolving learning environment [9, 12, 23, 13].

A cyclical feedback loop, characterized by ongoing collection, analysis, and application of feedback, is essential for cultivating a culture of continuous improvement. This enables educators and program leaders to adapt teaching strategies and enhance student engagement in physical activity, fostering a supportive learning environment. This approach aligns with competency-based education principles, emphasizing personalized learning and skill mastery, ensuring all students thrive in physical education experiences [9, 4, 12, 23]. By adopting diversified feedback approaches, educational institutions can elevate the quality of sports and health curriculum policies, promoting lifelong health and fitness.

6.2 Role of Student Feedback

Student feedback is crucial in shaping curriculum policies, particularly in sports and health education. Including student perspectives ensures curriculum development is responsive to learner needs, enhancing engagement and educational outcomes. Actively involving students in feedback processes provides educators with valuable insights into the effectiveness of teaching methods and content, facilitating informed adjustments aligning with students' interests and learning styles [1].

Integrating student feedback into curriculum development supports a student-centered approach fostering holistic learner development, aligning with 'Health First' curriculum principles that emphasize environments promoting both physical and psychological well-being [2]. Considering student feedback allows educators to identify areas where the curriculum may not meet health-related goals, enabling targeted improvements that enhance the overall educational experience.

Moreover, student feedback offers unique insights into the accessibility and inclusivity of curriculum policies. By identifying barriers to participation and learning, students can significantly influence strategies fostering equity and inclusivity in physical education programs. This collaborative approach enhances student engagement and contributes to a supportive environment encouraging all students to embrace physically active lifestyles, aligning with transformative physical education goals prioritizing personal and social growth [6, 9, 8, 4]. Such feedback is particularly valuable for addressing the needs of diverse student populations, including those with disabilities or from marginalized communities, ensuring curriculum policies reflect the diverse needs of all learners.

Technology-driven platforms for collecting student feedback provide an efficient means of gathering data on student experiences and outcomes. These platforms enable real-time feedback collection, equipping educators with timely insights that can drive informed curriculum adjustments, fostering a responsive and personalized learning environment [3, 9, 12]. By leveraging technology, educational institutions can establish a dynamic feedback loop supporting continuous improvement and adaptation of curriculum policies to meet students' evolving needs.

The role of student feedback in shaping curriculum policies is indispensable for fostering a responsive and inclusive educational environment. By involving students in the feedback process, educators can tailor curriculum policies to better reflect the diverse needs and aspirations of learners, fostering a more relevant and motivating educational environment promoting lifelong health and well-being. Research indicates that transformative physical education, emphasizing cognitive decision-making and self-motivation, significantly enhances students' out-of-class physical activity behaviors, preparing them for a lifetime of physical activity and personal growth. In light of recent shifts towards competency-based education, it is crucial for educational policies to support innovative practices prioritizing student-centered learning, ensuring all students acquire the necessary skills to thrive in an evolving society [9, 8, 12].

6.3 Integration of Feedback for Curriculum Improvement

Integrating feedback into curriculum development and policy adjustments is critical for enhancing the effectiveness of sports and health education programs. Feedback mechanisms are essential for identifying specific areas needing improvement, aligning curricula with educational objectives and diverse student needs. By incorporating continuous feedback, educators can adapt teaching strategies and content to better support student learning outcomes, ensuring educational practices evolve with learners' demands and the broader educational landscape. This is particularly important in competency-based education, emphasizing skill mastery over traditional metrics, thereby fostering personalized and effective learning experiences [10, 12, 23]. By systematically incorporating feedback from diverse stakeholders—students, educators, and parents—educational institutions can create dynamic, responsive curricula that enhance student engagement and learning outcomes.

A significant approach to integrating feedback involves standardizing measurement methods, particularly for assessing moderate to vigorous physical activity (MVPA) outcomes. Future research should aim for consistency and reliability in data collection, crucial for accurately evaluating the impact of physical education programs on student health and fitness [18]. Improved reporting of MVPA outcomes allows educators and policymakers to better understand current curricula's effectiveness and identify areas for enhancement.

Additionally, developing pedagogical strategies aligned with the 'foster virtue through education' ideology is essential for integrating feedback into curriculum development. These strategies should promote both physical and moral development, reflecting the holistic educational objectives of the 'Health First' curriculum [7]. By creating robust evaluation systems that accurately assess students' physical and moral growth, educational institutions can ensure curricula effectively foster desired educational outcomes.

Integrating feedback also involves exploring strategies to enhance student motivation and engagement in physical education. Addressing factors influencing student participation and interest allows educators to design curricula that resonate with students and encourage sustained involvement in physical activity [18]. This approach enhances the educational experience and supports the development of lifelong healthy habits.

As illustrated in Figure 5, the integration of feedback into curriculum development encompasses key mechanisms, measurement standardization, and pedagogical strategies that collectively enhance sports and health education programs. This visual representation underscores the interconnectedness of these elements and their role in fostering an effective educational environment.

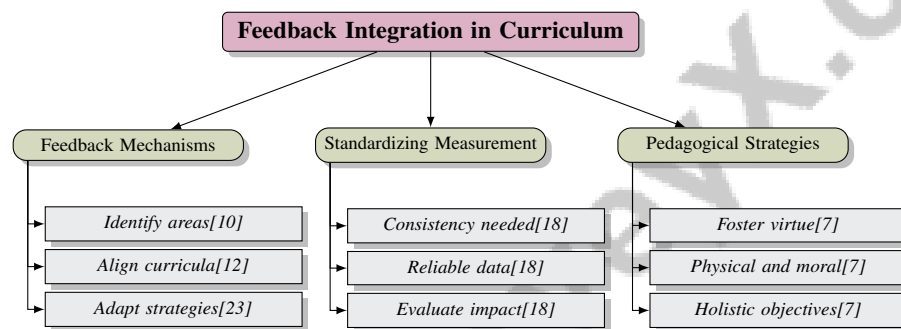


Figure 5: This figure illustrates the integration of feedback into curriculum development, highlighting key mechanisms, measurement standardization, and pedagogical strategies for enhancing sports and health education programs.

7 Teacher Professional Development

The domain of teacher professional development is fraught with multifaceted challenges that educators encounter in their pursuit of growth and efficacy. Recognizing these challenges is essential for understanding the specific barriers faced by physical education (PE) teachers. The following subsection delves into these challenges, focusing on the obstacles that hinder teachers from engaging in meaningful training experiences.

7.1 Current Challenges in Professional Development

PE teachers' professional development is impeded by several challenges affecting educational delivery. A primary issue is the inconsistency of comprehensive training programs that fail to address educators' evolving needs within modern educational contexts [8]. This inconsistency often results in varied competency levels among teachers, leading to disparities in educational quality and student outcomes.

Limited access to resources and support systems further complicates ongoing professional growth. Many PE teachers face constraints related to time, funding, and institutional support, which restrict their participation in meaningful professional development activities [20]. These constraints are exacerbated by teaching demands, leaving little opportunity for additional training or skill enhancement.

The integration of technology into PE curricula presents both opportunities and challenges. Although technology offers innovative teaching and learning tools, many educators lack the skills to effectively incorporate these tools into their practice [21]. This gap underscores the need for targeted training programs that equip teachers with essential digital competencies for navigating technology-enhanced education.

Moreover, the shift towards competency-based education (CBE) and personalized learning models necessitates a reevaluation of traditional professional development approaches. Educators must adapt to new pedagogical frameworks emphasizing student-centered learning and mastery-based progression [12]. However, this transition often faces resistance from teachers accustomed to conventional methods, who may lack adequate support for effective implementation [8].

Additionally, the diverse needs of students, including those with disabilities and from marginalized communities, present further challenges for PE teachers. Professional development programs must address competencies necessary for delivering inclusive and equitable education, ensuring all students have access to high-quality physical education [15]. This necessitates a comprehensive training approach encompassing both pedagogical and cultural competencies, enabling educators to meet their students' diverse needs effectively.

The challenges in the professional development of PE teachers highlight the urgent need for a coordinated training approach that addresses modern educational demands while incorporating innovative instructional models, such as Project-Based Learning (PBL). Emphasizing cognitive decision-making, self-motivation, and personal meaning in physical activity is vital for enhancing student engagement and achievement in PE, aligning with national standards, and preparing students for a lifetime of physical activity in a rapidly changing educational landscape [15, 8, 6, 9, 12]. Addressing these obstacles enables educators to improve their teaching practices and foster lifelong physical activity and well-being among students.

7.2 Strategies for Enhancing Professional Development

Enhancing professional development for PE teachers requires a strategic approach incorporating CBE and addressing the evolving educational landscape. A key strategy involves developing targeted training programs that enhance teachers' knowledge and skills in health education, aligning with the 'Health First' philosophy and broader health promotion strategies [2]. These programs should integrate health education into physical education curricula, equipping teachers with competencies to promote student well-being and lifelong physical activity.

To support this integration, professional development initiatives should offer personalized learning pathways tailored to educators' individual needs and goals. By adopting a competency-based framework, training programs can facilitate mastery-based progression, allowing teachers to advance upon demonstrating proficiency in specific skills and knowledge areas [12]. This approach not only enhances teacher competency but also fosters a culture of continuous improvement and lifelong learning.

A pivotal strategy for enhancing professional development programs is integrating technology-enhanced learning tools that facilitate personalized learning experiences and support competency-based education models. This approach addresses diverse academic needs while aligning with innovative educational practices that have gained prominence in the post-COVID-19 educational landscape [3, 8, 12]. Leveraging digital platforms allows educators to engage in interactive and immersive training experiences that enhance their digital literacy and pedagogical skills.

Collaboration and peer learning are essential components of effective professional development. Creating structured opportunities for teachers to collaborate and share best practices enhances their professional development and promotes the exchange of innovative ideas and experiences, contributing to more effective educational strategies and improved student outcomes [9, 12, 23, 3]. This collaborative approach can enhance teacher motivation and engagement, ultimately leading to improved teaching practices and student outcomes.

Furthermore, professional development programs should prioritize developing inclusive and culturally responsive teaching practices. By addressing the diverse needs of all students—including those with disabilities and those from marginalized communities—educators can create inclusive physical education programs that provide equitable access to high-quality physical activity. This approach fosters a supportive learning environment and promotes the academic and personal growth of every student, aligning with national standards for adapted physical education and the transformative potential of physical activity for lifelong health and well-being [6, 9, 15, 14]. This focus on equity and inclusivity aligns with CBE principles and supports advancing educational goals.

To effectively enhance professional development for PE teachers, a comprehensive strategy is essential. This strategy should integrate CBE that prioritizes mastery of skills, leverage technology to facilitate innovative teaching methods, and foster collaborative learning environments that promote project-based learning. Such an approach aligns with contemporary educational reforms and addresses the pressing need for improved student engagement and achievement in physical education, ultimately preparing students for a lifetime of active living [6, 9, 8, 12]. Implementing these strategies enables educational institutions to equip teachers with the skills and knowledge necessary to meet modern education challenges and promote lifelong health and well-being among students.

7.3 Future Directions in Professional Development

Future directions for professional development in PE emphasize integrating innovative pedagogical models and adopting technology to address the evolving needs of educators and students. A promising direction is expanding CBE frameworks that prioritize personalized learning experiences and mastery-based progression for teachers. By focusing on individual competencies and skill development, professional development programs can better prepare educators to meet the diverse needs of their students and foster inclusive educational environments [12].

Incorporating digital technologies into professional development is another critical area for exploration. Technology-enhanced learning tools can facilitate interactive and immersive training experiences, enabling educators to engage with new teaching methodologies and resources [21]. This approach enhances teachers' digital literacy and supports integrating technology into PE curricula, aligning with contemporary educational standards and student expectations.

Collaboration and peer learning will continue to play a significant role in the future of professional development. Establishing professional learning communities and networks provides educators with opportunities to share best practices, exchange ideas, and engage in reflective practice. These collaborative environments foster a culture of continuous learning and improvement by integrating transformative physical education practices and CBE models, which enhance teaching effectiveness and significantly improve student engagement and outcomes in physical activity and overall academic achievement [9, 12].

Additionally, future professional development initiatives should emphasize developing culturally responsive teaching practices that address the needs of diverse student populations. By prioritizing equity and inclusivity, educators can ensure all students have access to high-quality physical education, regardless of their backgrounds or abilities [15]. This focus aligns with broader educational goals and supports promoting lifelong physical activity and well-being.

Finally, integrating health education into PE professional development programs is essential for aligning with the 'Health First' philosophy and promoting holistic student development [2]. By equipping teachers with the knowledge and skills necessary to integrate health education into their curricula, professional development programs can enhance the overall educational experience and contribute to achieving public health objectives.

The future of professional development in physical education is poised to thrive by integrating innovative educational models such as Project-Based Learning (PBL), which enhances student engagement and learning outcomes; harnessing technology to support diverse teaching strategies; fostering collaboration among educators to share best practices; and promoting inclusivity to ensure all students have equitable access to physical activity, thereby addressing the decline in student motivation and participation in physical education programs. This multifaceted approach aims to cultivate a physically literate population that is not only active but also finds personal meaning and relevance in physical activities throughout their lives [4, 8, 3, 6, 9]. Pursuing these directions enables educational institutions to equip PE teachers with the tools and knowledge necessary to navigate modern education challenges and promote lifelong health and fitness among students.

8 Physical Education Curriculum Standards

8.1 Current Effectiveness of PJOK Curriculum

The PJOK (Pendidikan Jasmani, Olahraga, dan Kesehatan) curriculum is a cornerstone for physical education, emphasizing competency evaluation and innovative teaching methods like Project-Based

Learning (PBL). The 2013 Curriculum has been instrumental in effective educational processes, yet it faces challenges. It supports physical education programs and aligns with broader educational aims, improving student engagement and outcomes [8, 24]. Its effectiveness is gauged through student engagement, physical activity levels, and educational outcomes, fostering physical literacy and lifelong activity.

A detailed analysis indicates necessary enhancements in the PJOK curriculum. A significant issue is the inconsistent implementation of moderate to vigorous physical activity (MVPA) during PE lessons, often below recommended levels [18]. Addressing this requires strategies to ensure sufficient physical activity within school parameters.

Moreover, the focus on traditional sports might not engage all students, particularly those less skilled in conventional sports, potentially reducing motivation [14]. To address this, the curriculum should include diverse activities catering to various interests and promoting inclusivity.

Integrating health education within the PJOK curriculum is another improvement area. Embedding health education can provide students with a holistic understanding of the relationship between physical activity and health [2], enhancing physical literacy and informed health decisions.

Additionally, the PJOK curriculum's teaching and learning processes should employ both formative and summative assessments to provide a comprehensive view of student progress and curriculum efficacy [10]. This approach allows educators to pinpoint areas for enhancement and make informed decisions to elevate physical education quality.

8.2 Evolving Standards and Their Impact

Evolving standards in physical education significantly influence teaching practices and student learning by requiring curriculum adaptations to meet modern educational and societal needs. The shift towards competency-based education (CBE) illustrates this evolution, emphasizing personalized learning paths and mastery-based progression, necessitating student-centered pedagogical approaches [12]. This shift challenges traditional methods, encouraging innovative strategies that accommodate diverse learners and promote equity [13].

Incorporating health education into PE curricula is a critical aspect of evolving standards, aligning with the 'Health First' philosophy, which underscores the importance of environments supporting physical and psychological well-being [2]. By integrating health education, educators can enhance students' understanding of the connection between physical activity and health, fostering engagement and lifelong healthy habits [4].

Evolving standards also demand robust evaluation systems to assess student learning outcomes, incorporating formative and summative assessments to monitor progress and inform teaching [10]. These assessments provide insights into instructional effectiveness, allowing for curriculum adjustments that align with evolving standards.

The integration of technology into physical education, driven by evolving standards, offers new opportunities for enhancing teaching and learning. Technology-enhanced tools support interactive and immersive experiences, advancing digital literacy and innovative teaching practices [21]. By leveraging technology, educators can create dynamic environments that engage students and support educational goals.

Evolving standards, influenced by initiatives like the Common Core State Standards and increased integration of physical activity with academic subjects, necessitate a reevaluation of traditional teaching practices. This reevaluation should prioritize innovative instructional approaches, such as Project-Based Learning and transformative strategies, to enhance engagement and motivation while aligning with educational goals focused on holistic development and lifelong activity. As educators adapt to these changes, understanding the outcomes of integrating core subjects with physical education is crucial for effective implementation and improved student achievement [15, 8, 3, 6, 9]. Embracing these changes enables enhanced student outcomes and promotes lifelong physical activity and well-being.

9 Competency-Based Education

Competency-Based Education (CBE) represents a transformative shift in educational paradigms, focusing on personalized learning and mastery of skills rather than traditional time-based progression. This section delves into CBE's foundational principles and its implications for physical education, providing insight into its application and potential benefits.

9.1 Overview of Competency-Based Education

CBE addresses the limitations of conventional educational models by promoting mastery-based progression, allowing students to advance upon demonstrating proficiency in specific competencies [12, 13]. This approach fosters inclusivity by accommodating individual learning differences and tailoring educational strategies to meet diverse needs. In physical education, CBE's focus on skill acquisition aligns with the development of physical literacy, which encompasses motivation, competence, and knowledge essential for lifelong physical activity [3].

The integration of Project-Based Learning (PBL) within CBE frameworks further enhances the relevance of physical education by engaging students in real-world applications that promote critical thinking and problem-solving [8]. Ecological dynamics offers a framework for understanding motor learning within CBE, emphasizing interactions between the individual, task, and environment, which supports the development of adaptable movement skills [4]. Incorporating physically active lessons in CBE has shown positive impacts on physical activity levels and educational performance, particularly in early education settings [25].

By prioritizing skill mastery and personalized learning experiences, CBE offers a flexible educational approach that can significantly enhance physical education and student well-being [11].

9.2 Application of CBE in Physical Education

Applying CBE in physical education signifies a move towards personalized learning and mastery-based progression, supporting lifelong physical activity and well-being. CBE in PE emphasizes developing competencies that enable students to engage confidently in physical activities [12, 13]. Instructional strategies under CBE, such as PBL, engage students in meaningful projects that apply physical skills in diverse contexts, fostering critical thinking and understanding of health [8].

The ecological dynamics framework enriches learning by highlighting the interaction between individuals, tasks, and environments, promoting resilience and adaptability in movement skills [4]. Technology integration in CBE frameworks offers innovative opportunities for enhancing PE instruction, enabling personalized learning and progress tracking through interactive tools [21].

CBE provides a comprehensive approach to physical education, emphasizing skill development and personalized learning, thereby transforming educational practices and advancing student well-being [11].

9.3 Benefits of Implementing CBE in PE

CBE in physical education aligns educational practices with diverse student needs, promoting lifelong engagement in physical activity. By focusing on personalized learning pathways, CBE allows students to progress at their own pace, enhancing motivation and inclusivity [12]. Mastery-based progression ensures students acquire necessary skills and knowledge for confident participation in physical activities, fostering lifelong physical literacy [13].

Classroom-based physical activity interventions within CBE frameworks have been shown to improve academic outcomes, including behavior and attention [19]. CBE encourages innovative instructional strategies like PBL, which promotes critical thinking and problem-solving through real-world applications [8]. The ecological dynamics perspective within CBE emphasizes dynamic learning environments that support movement skill development, promoting adaptability and resilience [4].

Implementing CBE in physical education offers a flexible teaching approach that prioritizes skill development and promotes lifelong physical activity and self-motivation, enhancing student well-being [9, 23].

9.4 Challenges of Implementing CBE in PE

Implementing CBE in physical education presents challenges such as the lack of a unified definition, leading to variability in application [23]. This ambiguity complicates curriculum development and assessment standardization. Addressing educational inequity is another challenge, as CBE aims to cater to individual needs but may inadvertently exacerbate disparities [13].

Integrating PBL within CBE poses challenges due to practical implementation difficulties and resource constraints [8]. Additionally, methodological limitations in CBE research hinder definitive conclusions about its efficacy, highlighting the need for more rigorous studies [19].

Addressing these challenges requires a coordinated approach to clarify definitions, ensure equity, and integrate innovative instructional strategies, thereby improving CBE implementation and fostering lifelong physical activity [9, 19, 8].

9.5 Future Directions and Research Needs

Future research in CBE within physical education should focus on establishing a common framework to address assessment and implementation challenges [23]. Exploring CBE applications across various educational fields can offer insights into effective integration strategies, promoting personalized learning across disciplines.

Clarifying the concept of physical literacy is essential for enhancing its integration into educational practices, promoting lifelong physical activity [3]. Assessing the effectiveness of physical literacy-focused curricula is crucial for advancing educational outcomes and public health objectives.

Addressing these research needs can enhance CBE's effectiveness, contributing to advancing physical education and promoting lifelong health and fitness through a cohesive framework and a comprehensive understanding of physical literacy [3, 9, 4].

10 Conclusion

This survey highlights the transformative potential of comprehensive evaluation and development strategies in physical education, emphasizing the need for systemic changes to address the diverse needs of students. Competency-based education emerges as a key strategy, offering personalized learning pathways that facilitate mastery and promote physical literacy, thereby encouraging lifelong engagement in physical activities. The integration of mindfulness, motivation, and meaning within curricula enhances student engagement and commitment to sustained physical activity, while embedding health education within physical education curricula supports holistic well-being. Evidence from college basketball curriculum reforms underscores the positive impact of health-focused approaches on students' physical and mental health.

A robust evaluation system, combining quantitative and qualitative methods, is crucial for accurately assessing the quality of physical education. This approach addresses traditional sport discourses and promotes equitable assessment practices, ensuring that all students' abilities are recognized and nurtured. Future research should prioritize the development of comprehensive training programs for physical education teachers, focusing on project-based learning and its integration with other academic subjects. Additionally, strategies for professional development and infrastructure enhancement are vital for the effective implementation of curricula.

The successful implementation and scaling of physical activity interventions rely on early planning and stakeholder engagement, as highlighted by the PRACTIS guide. Enhancing participation quality through ecological dynamics and enriched environments is essential for improving health and well-being, while the SAAFE principles can elevate the quality of organized physical activity sessions, increasing activity levels and enjoyment. Addressing the current health crisis among students requires urgent policy changes and strategic implementation, enabling educational institutions to enhance physical education programs and promote lifelong health. Future research should integrate psychological theories with empirical studies to better understand the mechanisms influencing physical activity behaviors and develop targeted interventions, prioritizing the integration of physically active lessons in secondary schools to explore diverse health outcomes and establish theoretical foundations for interventions.

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