Entendimiento y aplicación de los profesores de educación física sobre el modelo de aprendizaje basado en proyectos y las habilidades 4C

Understanding and applying of physical education teachers regarding the project based learning model and 4C skills

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How to cite in APA

Ahadi Priyohutomo, Komarudin, & Sridadi. (2024). Understanding and applying of physical education teachers regarding the project based learning model and 4C skills. *Retos*, *63*, 580–589. https://doi.org/10.47197/retos.v63.107062

Abstract

Introduction: 21st century is an important century to equip students in learning and innovating.
Objective: identify how physical education teachers implement and understand the PjBL learning model and 4C skills.
Methodology: quantitative research with a descriptive approach. The subjects of this study were 35 physical education teachers. Data collection was through structured questionnaires and unstructured questionnaires.
Results: most physical education teachers in East Java still have difficulty in implementing PjBL learning and 4C skills. 40% of teachers rarely apply PjBL in learning, 14.3% do not understand the concept, 34.3% of teachers have not integrated 4C skills, 22.9% do not understand 4C skills, 57.2% of teachers have not applied the PjBL model to big ball games, and 51.5% have not integrated 4C skills in the learning process.
Discussion: although most physical education teachers understand the PjBL model and 4C skills, their implementation is still limited. Teachers face difficulties in applying the 4C and PjBL concepts effectively, which affects students' ability to develop creative, collaborative, and critical thinking skills.
Conclusions: need to improve the understanding and application of the PjBL model and 4C skills in physical education to support the development of students' cognitive and skills as a whole.

Keywords

Project based learning ; 4C skill ; 5.0 society ; physical education

Resumen

Introducción: El siglo XXI es un siglo importante para equipar a los estudiantes en el aprendizaje y la innovación.
Objetivo: identificar cómo los profesores de educación física implementan y comprenden el modelo de aprendizaje PjBL y las habilidades 4C.
Metodología: investigación cuantitativa con enfoque descriptivo. Los sujetos de esta investigación fueron 35 profesores de educación física. Recogida de datos mediante cuestionarios estructurados y cuestionarios no estructurados.
Resultados: La mayoría de los profesores de educación física en Java Oriental todavía experimentan dificultades para implementar el aprendizaje PjBL y las habilidades 4C. El 40% de los docentes rara vez aplica PjBL en el aprendizaje, el 14,3% no comprende el concepto, el 34,3% de los docentes no ha integrado las habilidades 4C, el 22,9% no ha comprendido las habilidades 4C, el 57,2% de los docentes no ha aplicado el modelo PjBL en juegos de pelota grande , y el 51,5% no ha integrado las habilidades 4C en el proceso de aprendizaje.
Discusión: aunque la mayoría de profesores de educación física entienden el modelo de aprendizaje PjBL y las habilidades 4C, su implementación aún es limitada. Los profesores enfrentan dificultades para aplicar los conceptos 4C y PjBL de manera efectiva, lo que afecta la capacidad de los estudiantes para desarrollar habilidades creativas, colaborativas y de pensamiento crítico.
Conclusiones: es necesario mejorar la comprensión y la aplicación del modelo PjBL y las habilidades 4C en educación física para apoyar el desarrollo cognitivo y de habilidades de los estudiantes en su conjunto.

Palabras clave

Aprendizaje basado en proyectos; habilidades 4C; sociedad 5.0; educación física

Introduction

Education has become one of the most important roles in a country's development. This development is not isolated from a change in the curriculum that happens every year; this change can make the educational process meaningful for the pupils. As the cornerstone of the Indonesian nation, physical education plays a crucial role in fostering the development of pupils' knowledge, movement, and character (Arifin, 2017). Physical education significantly contributes to a child's development through a variety of physical activities and movement activities. These activities facilitate a child's growth, addressing cognitive, psychomotor, affective, and personality traits that shape their character (Mustafa & Dwiyogo, 2020; Yuliawan, 2016). Physical education, always associated with physical activity, conveys the process of teaching and meaningful learning activities to the pupils in realizing the needs and benefits of physical health throughout life (Abduljabar, 2014; Firmansyah, 2011). Physical education plays a crucial role in the national educational program, providing a comprehensive understanding of all aspects of education through a variety of flexible and effective learning situations. This approach facilitates students in maximizing their physical, cognitive, social, emotional, intellectual, and mental potential (Mustafa, 2022). It relates to the changes and developments of the times, which does not close the possibility that the role of physical education requires various changes in the form of curricula, learning models, and learning methods to provide usefulness and meaning of learning relevant to sharing the demands of the development of the ages (Prasetyo & Hamami, 2020; Santika et al., 2022). The emergence of various directions of education development in Indonesia has become a crucial factor in promoting quality and quality learning.

In the 21st century, Ensuring knowledge development to reach a high level by equipping learners with the necessary skills to learn and innovate is extremely important (Pare & Sihotang, 2023). The challenges of the 21st century, shaped by the era of globalization, brought about a variety of changes in science, social, technological, and learning processes (López Peláez et al., 2022; Setiadi, 2019; Sheng et al., 2019). Emerging developments prove the changes that occur in every component of 21st-century growth (Saleh, 2019). In the 21st century, learning is changing the increasingly complex learning system by providing meaningful learning experiences to students (Martini, 2018). This change emphasizes that schools should move towards student-centered learning rather than teacher-centered learning (Heryanti et al., 2022), and this change makes learning patterns more varied and gives students the skills to learn and think systematically in shaping their future direction.

4Cs (critical thinking, creativity, collaboration, and communication) skills in 21st century learning are important as a supporting form in pupils' learning process (Dwijayanti, 2021). The comprehensive national education system should generate a variety of skills or competencies based on physical education subjects, requiring the development of such skills in the learning process (Care et al., 2018). Specifically, students need 4C skills to adapt to a diverse range of technological and scientific advancements, utilizing the skills they lack to enhance their self-worth (Trilling & Fadel, 2012). Various literature shows that physical education learning does not integrate critical thinking, creativity, collaboration, and communication skills into the learning process. Therefore, this research re-examines the role of physical education teachers in designing learning models (Khairuddin et al., 2023), the emergence of various teacher limitations in developing and implementing learning models is one of the problems in providing quality physical education learning (Putra & Sepriadi, 2022).

The most important component in the teaching-learning activities is the implementation of the arranged learning model with comprehensive material delivery to realize the physical education learning achievements. The effort of designing the learning model must meet the characteristics and necessities of the learners and the demands of the current era. Therefore, the design must be systematic (Prasrihamni et al., 2022). The changing generations and evolving times each year present unique challenges and skills for physical education teachers in optimizing the abilities of students. The various learning models applied must provide meaningful learning for students, both in terms of intellectual abilities, character traits, and movement. Various learning models of physical education for various learning levels include cooperative learning, sports education, and teaching games for understanding. However, some learning models are not applied such as project-based learning (Arufe-Giráldez et al., 2023).

Teaching of physical education that exists in the Merdeka curriculum and the previous curricula emphasizes how the given science can be transformed into learning activities that are centered on the pupil and not the teacher as the center of information (Priyambudi et al., 2023; Sudrahat et al., 2022). Merdeka curriculum empowers the educator by creating quality learning quality based on the needs and environment of the pupils and focuses on the participation of pupils in the learning process to enhance the involvement of students in learning and provide opportunities for pupils to develop and optimize the potential of creativity and capabilities of the apprentices (Masturi, 2023; Mujiburrahman et al., 2023). Based on this, it explains that the role of physical education has not been followed up by several physical education teachers, the results of the evaluation of the learning activity system in physical education showed low results with the majority of teachers still using a teacher-centered approach rather than a student-centered approach (Putra & Sepriadi, 2022), with the above explanation, the author wants to identify the application and understanding of physical education teachers towards the project based learning model and 4C skills (critical thinking, creativity, collaboration communication).

Method

This quantitative study uses a descriptive approach to describe the existing variables through numerical data that reflect the current situation. The purpose of this study is to obtain subjective understanding from teachers related to the implementation of the Project-Based Learning (PjBL) learning model and 4C skills. Study focuses on how teachers give meaning, representation, and understanding to the elements of the implementation of the PjBL model and 4C skills in the educational context. This work adopts a phenomenological approach, which is based on an interpretive paradigm, with the aim of describing and analyzing the decision-making process carried out by teachers in the implementation of the PjBL learning model and the development of 4C skills in students at various levels of education.

Participants

Sampling technique in this study used proportional random sampling by taking 35 physical education teacher respondents, consisting of 16 elementary school teachers, 12 teachers from junior high schools, and 7 teachers from senior high schools in East Java, Indonesia.

Table 1. Subject categories from every region

No	Education Level	Region	Teachers' Names	Sex Types	Number of the Teachers
1.	Public Primary School	Jombang	FJR	Male	2
			SWT	Male	
		Malang	PSIWN	Female	3
			ADM	Female	
			RMD	Male	
		Nganjuk	MKN	Male	1
		Lumajang	RVDM	Female	1
		Probolinggo	RZA	Male	2
			DEW	Male	
		Sampang	HLH	Female	1
		Trengggalek	ALS	Female	1
		Kediri	WOY	Male	1
		Total			12
2.	Private Primary School	Jember	RAH	Male	1
		Malang	DAF	Male	1
		Blitar	JABQ	Male	1
		Sidoarjo	MWHAR	Male	1
		Total			4
3.	Public Junior High School	Malang	ARFH	Male	2
			MFA	Male	
		Pasuruan	FLH	Male	2
			MSAFZ	Male	
			MF	Male	
		Banyuwangi	YDP	Male	1
		Magetan	IRWY	Male	1
		Ponorogo	PHP	Male	1
		Total			8
4.	Private Junior High School	Malang	SAD	Male	3
			FAJ	Male	
			YWD	Female	
		Ponorogo	ERWN	Male	1
		Total			4

		Malang	AHBA	Male	2
			VCY	Male	
		Lumajang	YRS	Male	1
5.	Private Senior High School	Pasuruan	EDF	Female	1
		Jember	DPT	Female	1
		Nganjuk	APP	Male	1
		Ponorogo	WYN	Male	1
		Total			7
The Physical Education Teachers in the Eastern Java Region					35

Procedure

Research procedure uses data collection instruments in the form of structured questionnaires with Guttman scales and Likert scales to measure the application and understanding of the PjBL and 4C learning models in physical education learning, while the unstructured questionnaire measured obstacles and perceptions of the application of PjBL and 4C. At the data collection stage, the researcher distributed the questionnaire online using Google Form for 2 mounths. Questionnaire consisted of 10 questions, including: (1) do teachers understand the concept of a project-based learning model for physical education? (2) do teachers apply a project-based learning model to physical education learning? (3) do teachers apply the PjBL model to basketball game material? (4) do teachers rarely or never encounter obstacles when applying the PjBL model to physical education learning? (5) what makes teachers apply the PjBL model to physical education learning? (6) do teachers know the concept of 4C skills (critical thinking, creativity, collaboration, and communication) as 21st century skills? (7) do you apply and develop 4C skills (critical thinking, creativity, collaboration, and communication as 21st century skills) in the physical education learning process? (8) do you apply and develop 4C skills by implementing basketball games in the learning process? (9) do you know the concept of 4C skills (critical thinking, creativity, collaboration, and communication as 21st century skills), in your opinion should these skills be developed and improved during the physical education learning process? (10) do you apply and develop 4C skills (critical thinking, creativity, collaboration, and communication as 21st century skills) in the physical education learning process?

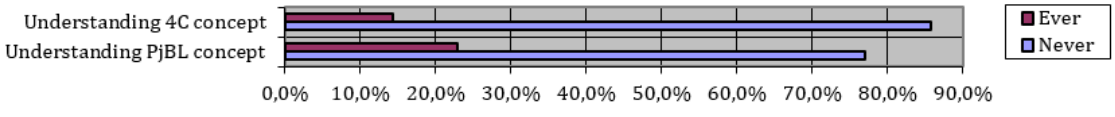
Data analysis

Data analysis used in this study includes data reduction, data presentation, and drawing conclusions. The following explanation, the steps taken in this study were carried out using a questionnaire as a data collection tool then the results of the presentation were analyzed, the results of data reduction were then reviewed in the form of narrative text patterns, this was done to describe the data in the form of a presentation, and the next step was to draw conclusions by analyzing the presentation of the data to strengthen the data obtained from the field by concluding the results of the study.

Results

Understanding the concept of Project Based Learning-based learning models obtained results of 14.3% of physical education teachers do not yet have an understanding of the concept of Project Based Learning learning models while 85.7% of physical education teachers have an understanding of the concept of project based learning models, while understanding the concept of 4C (critical thinking, creativity, collaboration and communication), obtained results of 22.9% of physical education teachers do not yet have an understanding and concept of 4C skills and 77.1% of physical education teachers have an understanding of the concept of 4C skills (critical thinking, creativity, collaboration and communication), similar to what is shown in figure 1.

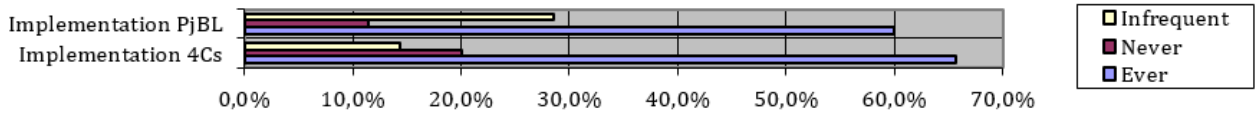
Figure 1. Understanding of PjBL and 4C concepts



	Understanding PjBL concept	Understanding 4C concept
Ever	22,9%	14,3%
Never	77,1%	85,7%

Application of the project based learning model in physical education learning, obtained results of 40% consisting of 11.4% and 28.6% of physical education teachers never and rarely apply the project based learning model in physical education learning and 60% of physical education teachers have applied the project based learning model in physical education learning and for the application of 4C skills in physical education learning, the results were 34.3% consisting of 20% and 14.3% of physical education teachers never and rarely apply 4C skills in physical education learning and 65.7% of physical education teachers have applied 4C skills in physical education learning, as shown in figure 2.

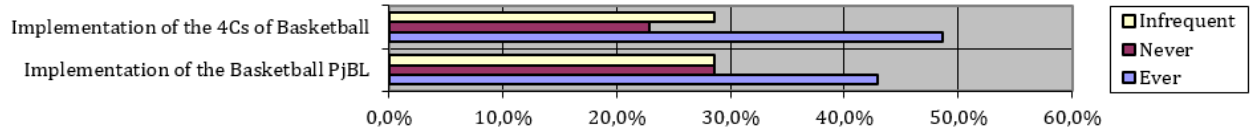
Figure 2. Implementations of the PjBL and 4C Models in Physical Education



	Implementation 4Cs	Implementation PjBL
Infrequent	14,3%	28,6%
Never	20,0%	11,4%
Ever	65,7%	60,0%

Based on the results of research conducted by researchers as many as 35 physical education teachers spread across East Java, Indonesia (Malang, Kediri, Pasuruan, Sidoarjo, Sampang, Magetan, Lumajang, Jember, and Ponogoro) obtained results of 57.2%, consisting of 28.6% and 28.6% of physical education teachers never and rarely apply the project learning model to basketball games, 42.9% of physical education teachers have applied the project based learning model, while the application of 4C in the basketball learning process obtained results of 51.5% consisting of 22.9% and 28.6% of physical education teachers never and rarely apply 4C in the basketball learning process, and 48.6% of physical education teachers have applied 4C skills to basketball game materials, as shown in figure 3.

Figure 3. Implementation of Learning PjBL and 4C Models in Basketball Games



	Implementation of the Basketball PjBL	Implementation of the 4Cs of Basketball
Infrequent	28,6%	28,6%
Never	28,6%	22,9%
Ever	42,9%	48,6%

Discussion

This study explains that almost all teachers of physical education in the East Java Province have an understanding of the model of project-based learning, and not all teachers have a similar understanding. The application of the PjBL and 4C learning model was not fully implemented in the learning activities of physical education, identified based on the constraints faced by teachers with a lack of conceptual understanding and application, such as the lack of knowledge of application and understanding in physical learning teachers about the concepts of 4C skills, and the lack ability of learners participating in the process of learning. The other impediments such as difficulty in directing children in producing projects. Students with learning difficulties took a long time. The project-making process and participants tend to be passive. Physical education plays a crucial role in developing a project-based learning model that enhances motivation, improves movement outcomes, fosters confidence and criticism, enhances collaboration skills, fosters the emergence of self-regulation, fosters innovation, fosters creativity, and fosters collaboration (Ahmad Yani, 2018; Bagus et al., 2023; Christian, 2021; Festiawan et al., 2024; Irawan Eka Saputra et al., 2016; Selis et al., 2023; Syafruddin, 2024; Umar et al.,

2023; Utami et al., 2022). One of the learning models that significantly influences the cognitive and psychomotor achievement of students in the context of learning physical activity.

Understanding and implementation of the teachers about 4C within the context of PE are excellent. They implemented the 4C comprehensively although the implementation of the basketball game was not intensive. The researchers also found the teachers had low 4C skill conceptual understanding. Various literature reviews found low figures in some categories in 4C skills, explaining that the emergence of teachers' unwillingness to apply learning effectively and effectively becomes a limitation on the pupils' ability to develop creative thinking skills (Welch et al., 2021). In addition, the results of a descriptive analysis of 22 pupils revealed that critical thinking skills were still low among pupils in primary school (Sulasmi & Lukita Sari, 2021). The same study found that the average creative thinking of students in class A was 28.66% and in class B was 13.71% (Ghazari et al., 2018). Therefore, the roles of physical education for the learners in developing creativity and collaborative skills are important (Ihwanto et al., 2022). The mean score of collaborative skills obtained a percentage of 69.05%, a low category. Nine learners had a percentage of 64% while 5 learners with 36% (Fitriah et al., 2020). Based on the explanations, the roles of physical education in developing collaborative skills require some improvements especially to provide the learners with meaningful experience and the appropriate relevance and interpretation of PE to develop the communication skills (Opstoel et al., 2019).

Roles of skills and creativity become the capital for humans to solve problems, be creative in learning, provide important stimulus for excellent growth, participate and communicate in the learning system as the part of learning conceptual framework, and develop creative and critical thinking with the participation in the learning process (Silber-Varod et al., 2019). The emergence of technology without the learner's and parents' capabilities to manage the advancement will bring technological drawbacks to social interaction (Triana et al., 2023). However, the positive impact of technological advancement is to motivate the learners' learning. The roles of education are important to provide self-conception and to prevent and avoid carelessness toward the environment. The realizations of these roles are important to keep because these efforts influence the evaluation while interacting with peer classmates, the carelessness, the irresponsibility, and the negative interactions among the classmates (Soliha, 2015). The difficulties of the learners to join the learning activities require efforts to improve and develop skills of interacting socially. This skill could be developed with learning activities with active roles of learners while promoting collaborative and communicative activities. The roles of collaboration are important as the foundations for the learners to solve the tasks and to carry on the responsibilities. These are useful as the realizations of learning achievements at schools (Liang, 2017; Morrison & Lowther, 2010; Osman et al., 2011; Redhana, 2019). Collaborative participations occur when a problem is available to solve with collaboration. This situation allows learners to put their efforts into solving the problem and participate to take the actions in accomplishing the tasks and carrying on the responsibilities (Ilmiyatni et al., 2019). Systematically, these matters could go along with some interactions and communications while collaborating. These two actions, interacting and communicating, are correlated and empower each other (Liang, 2017). They also facilitate learners to express their notions and ideas by actively participating and solving various tasks collaboratively (Frazier & Reynolds, 2012). The association of physical education with various motion activity demands requires the concept of developing motion to direct the learners in realizing collaborative and communicative skills. Therefore, physical education with various lessons has the right and obligation to provide these benefits.

In this research, the 4C conceptual understanding did not go along with the improved understanding of the 4C skills of the learners. The involvement of PE requires further review in applying the PjBL model toward the 4C skills comprehensively. The problems of learners' 4C skill understanding occurred due to ineffective PE implementation, starting from the learning steps and syntaxes. They were not systematic and orderly so these matters severed the interaction and the given stimulus by PE teachers. The results were the learners could not understand the information and the material could not transformed excellently. The educational background, understanding, and social environment of teachers could not fully support the interactions of the learners. These limitations made the transmission process in the learning could not be understood by the learners comprehensively. The other problems were limited media and supporting facilities to promote the PJBL model. Media are important for learning and become the indicator of learning success that facilitates learners to reach the learning objectives. The implementation of media for the PjBL could not be systematically explained in

the learning model syntaxes. Thus, the teachers' creativity must be excellent to realize excellent media based on the PjBL model.

4C and PjBL models are different things but they are useful as models to improve the 4C skills of the learners. Specifically, 4C skills are important for learners to adapt to various technological and scientific developments (Trilling & Fadel, 2012). Thus, learners without the skills must be improved to reach the ideal quality. Many literature works explain that physical education lessons with 4C skill development do not integrate the 4C skills (critical thinking, creativity, collaboration, and communication) comprehensively. Therefore, immediate response by integrating the PjBL model and 4C skills is important.

Conclusions

21st century is vital to determine the cognitive development of the learners by ensuring the learners have learning and innovation skills. The encountered challenges in this century occur due to the globalization era with various changes in science, society, and technology with vast annual advancement. This matter proves the changes are observable in each component during this century. This research describes that most PE teachers in Eastern Java have similar understanding. Most PjBL implementations were not based on the PE learning activities. The evidence was observable in the encountered challenges by PE teachers. Some teachers did not understand the 4C skill concept and the PjBL model implementation. The involvement of physical education needs review to apply the project-based learning with the 4C skills comprehensively. Further research about PjBL model development with the integration and improvement of 4C skill components (critical thinking, creativity, collaboration, and communication) is important for the learners comprehensively.

Acknowledgements

Author would like to thank the physical education teachers in the east java region, Indonesia.

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