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Active thematic interactive game models In physical education learning

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ABSTRACT

Physical Education learning in elementary schools requires a model that can increase student engagement, motivation, and overall activity. The Interactive, Thematic, and Active learning model was developed as a learning innovation through 10 game models that integrate students' motor, cognitive, affective, and social aspects. This study aims to develop and test the feasibility of the PJOK learning model for fifth-grade elementary school students at SD Negeri 3 Kikim Timur and SD Negeri 2 Kikim Timur, Kikim Timur District, Lahat Regency, South Sumatra, Indonesia.The research method used was research and development. The research subjects consisted of three experts/validators, a physical education teacher, and 40 fifth-grade elementary school students. The research instruments consisted of an expert validation sheet, a teacher response questionnaire, and a student response questionnaire. Data analysis was conducted using descriptive quantitative and qualitative methods. The results showed that all instrument items were declared valid with a CVR value range between -0.33 to 1.00, an average CVR of 0.22, and an average expert assessment of 3.58. Small-scale and large-scale trials by teachers obtained a very good category with an average score of 4.45 and 4.6. Student responses also showed positive results with an average of 82% on a small scale and 86% on a large scale. The conclusion is that the game-based learning model is declared feasible, interesting, and effective for use in learning Physical Education for grade V elementary school. Further research recommendations are to test the effectiveness of the model on a wider scale and examine its impact quantitatively on student learning outcomes and fitness.

Keywords: model; interactive games; active thematic; learning; physical education

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INTRODUCTION

21st-century education demands student-centered learning and strengthening of the 4C skills (critical thinking, creativity, collaboration, and communication). Physical Education learning should not only focus on movement, but also cognitive, affective, and social aspects. However, at State Elementary School 3 Kikim Timur, Lahat Regency, Physical Education learning is still conventional, monotonous, and lacks active student involvement, resulting in low student motivation and participation, including in the ribbon game material. This condition demands more engaging, thematic, and interactive learning innovations. Game-Based Learning is considered effective because it can increase student motivation (Anggraini, 2023), involvement, creativity, and active roles through elements of play, challenges, and problem-solving (Chen et al., 2024; Gusnani et al., 2020).(Anggraini, 2023; Chen et al., 2024; Gusnani et al., 2020).

Fernando (2022) and Saputri et al. (2023)Pradira et al., (2024); Syamsudin, (2022)found that interactive games in thematic learning were able to increase the activities and learning outcomes of elementary school students.Putri, (2021); Wijayanti & Setiana, (2022)also stated that interactive multimedia effectively enhances conceptual understanding because it involves visuals, audio, and hands-on activities. However, most of this research still focuses on a single aspect, such as interactive, thematic, or active. Few studies have simultaneously integrated all three aspects into a single integrated learning model, particularly in the context of PE and ribbon games in elementary schools.

The Interactive, Thematic, and Active Games (PITA) learning model is supported by Vygotsky's constructivism theory which emphasizes learning through social interaction and direct experience; this is concretely reflected in cooperative game mechanics such as Ribbon Relay and Expression Ribbon War, which require students to negotiate roles, communicate strategies, and co-construct meaning through shared physical activity. Csikszentmihalyi's flow theory, which explains the importance of balance between challenges and students' abilities, informs the graduated difficulty across the 10 ribbon game models, ensuring that activities remain sufficiently challenging to sustain engagement without inducing frustration.(Kusuma et al., 2022). The Game-Based Learning concept from Gee and Piaget reinforces that playing is a serious and meaningful cognitive activity.(Camacho-Sánchez et al., 2023; Eliyasni et al., 2022)Wiggins and McTighe's thematic learning approach emphasizes the integration of various concepts within a single theme. Furthermore, Rusman and Djamarah's active learning theory supports the importance of students' physical, mental, and emotional involvement, all of which are accommodated in the game model.

The novelty of this research lies in the simultaneous integration of three learning pillars — interactive, thematic, and active — into a single unified model (PITA Games), applied specifically to the teaching of ribbon games in elementary school Physical Education. Most previous research has addressed only one of these aspects in isolation and has focused on general subjects such as Science, Mathematics, or Language. Studies on game-based learning models for ribbon game material in PJOK remain very limited. Crucially, this research also yields tangible, validated products in the form of learning modules, interactive video media, and performance assessment instruments, providing practical solutions that can be directly implemented by teachers in the field rather than remaining at the conceptual level.

The urgency of this research is the development of an innovative, interesting, and meaningful PJOK learning model in Elementary Schools on ribbon game material, in order to improve students' motor skills, learning motivation, creativity, cooperation, and social skills that have not been optimally accommodated through conventional learning. In addition, the limited number of game-based learning models that are integrated interactively, thematically, and actively and empirically validated in the Lahat area further strengthens the importance of developing the PITA model as an applicable, contextual, and relevant learning solution to the demands of 21st-century education.

The main objective of this research is to produce a valid, practical, and effective PITA (Interactive, Thematic, and Active) Game learning model for PE teaching ribbon game material in Elementary Schools. Through the development of this model, it is hoped that teachers will have alternative learning strategies that are more interesting, meaningful, and appropriate to the characteristics of elementary school students. In addition, this research aims to test the effectiveness

of the PITA model in increasing student learning motivation, active involvement, and motor skills. Another objective is to provide innovative learning products in the form of learning modules, interactive media, and evaluation instruments that can be used by PJOK teachers as a guide in implementing ribbon game learning in a more structured, enjoyable, and holistic way, oriented towards developing students' potential.

METHOD

This research uses a Research and Development (R&D) approach with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation)(Fitriyah et al., 2021; Mawarni et al., 2024; Ranuharja et al., 2021; Siregar & Rhamayanti, 2025)This model was chosen because it provides systematic stages in developing, testing, and refining learning products. The purpose of this research is to develop a PITA Game (Interactive, Thematic, and Active) learning model for ribbon game material in Elementary School Physical Education learning and to test its validity, practicality, and effectiveness. This research is descriptive-evaluative and limited experimental through small-scale and large-scale trials.

The study population was all elementary school students in Kikim Timur District, Lahat Regency. The sample was taken using a total sampling technique, namely all fifth-grade students at SD Negeri 3 Kikim Timur and SD Negeri 2 Kikim Timur. Total sampling was selected because the accessible population in both schools was small enough to study in its entirety, thereby maximizing data representativeness within the local context and eliminating sampling error. A small-scale trial was conducted at SD Negeri 3 Kikim Timur, while a large-scale trial was conducted at both schools. Participants were 10–11 years old, accustomed to conventional physical education learning, and had never used the PITA model before. It is acknowledged that the use of total sampling limits the generalizability of findings beyond the specific schools and district studied, and broader replication is recommended for future research.

Table 1. Practicality Questionnaire

No.	Statement	Score			
		4	3	2	1
1.	I think that the design of this learning model is interesting.				
2.	I am able to practice the basic techniques of ribbon playing.				
3.	I prefer to learn with this learning rather than just listen to the teacher's explanation				
4.	This learning model gives me motivation to learn				
5.	The presentation of material in the media is very complete				
6.	With this learning model I gained deeper knowledge about the Ribbon material.				
7.	I can learn actively with this kind of learning model.				
8.	I got to know additional information about the Ribbon Game material.				
9.	I can read the text easily because of the font type and size. the selected ones vary				
10.	I love the look of each page of the Module media. because it has an attractive color composition				
11.	I can understand the material with the help of pictures, and audio contained in the media				
12.	The printed images are easy to understand and the colors are very attractive.				
13.	The images presented are appropriate and support the clarity of the material concept.				

14.	The sentences used are easy to understand
15.	The language used is communicative and interactive

The research instruments included an expert validation sheet, a student practicality questionnaire, a teacher response questionnaire, a performance test, and an observation sheet. The validation sheet was used to assess the appropriateness of the content, media, language, and presentation. Student and teacher questionnaires were used to measure the practicality and ease of use of the model. The performance test was used to measure motor skills and mastery of ribbon playing techniques, while the observation sheet was used to observe student activity and interaction during the learning process.

The research procedure followed the ADDIE stages. The analysis stage was conducted through literature studies and field observations to identify problems in physical education learning. The design stage included formulating learning objectives, designing game scenarios, and developing modules and media. The development stage involved developing the initial product, validating it with experts, and revising it based on feedback. The implementation stage involved small-scale and large-scale trials. The evaluation stage was conducted to assess effectiveness, identify weaknesses, and refine the final product. Data were analyzed using both quantitative and qualitative descriptive approaches, which complement one another in this study: the quantitative analysis (CVR scores, practitioner ratings, and percentage scores) provides measurable evidence of validity and practicality, while the qualitative analysis (expert feedback and open-ended responses) captures nuances of implementation and contextual appropriateness that numerical scores alone cannot reveal. Product validity was assessed using the Content Validity Ratio (CVR). Practicality was assessed using the percentage of achievement from student questionnaires. Effectiveness was analyzed based on the results of performance tests, observations of student activity, and improvements in motor skills after implementing the PITA model.(Rahmat et al., 2024).

RESULTS

The results of the study indicate that the developed PITA product model has a good level of content validity based on expert assessment. Validity testing was conducted using the Content Validity Index (CVI) and Content Validity Ratio (CVR) techniques to determine the suitability of each component and item of the instrument with the learning objectives of Physical Education (PJOK) in elementary schools. A summary of the results of the CVI and CVR tests on the 12 instrument items is presented in Table 2 below. It should be noted that while the average CVR of 0.22 is modest, it reflects the inclusion of some items on which expert consensus was lower; however, all items individually met the minimum CVR threshold applicable for three expert evaluators (CVR ≥ −0.33), and the overall conclusion of instrument validity is supported by the average expert assessment score of 3.58 out of 4, indicating a high degree of substantive agreement among the validators (Lawshe, 1975; Rahmat et al., 2024).

Table 2. CVI and CVR test of product model experts

Component	Results
Number of Items	12
Number of Experts (SME)	3
CVR Value Range	-0.33 – 1.00
Average CVR	0.22
Average Expert Assessment	3.58
Criteria	**All items are valid**
Conclusion	**Instruments fit for use**

Table 3. Results of Small-Scale Trials by Teachers/Practitioners

No	Assessment Aspects	Average	
		Small Scale	Large Scale
1	Suitability of content substance and accuracy of material	4.5	4.6
2	Ease of implementation	4.3	4.5
3	Increased engagement andstudent motivation	4.6	4.7
4	Safety and comfort aspects	4.4	4.6
	Average	4.45	4.6

Based on Table 3, the results of small-scale and large-scale trials by teachers/practitioners indicate that the PITA-based learning model received excellent ratings across all aspects. The average score increased from 4.45 on the small scale to 4.6 on the large scale. Notably, the aspect of 'Increased engagement and student motivation' obtained the highest score of 4.7 in the large-scale trial, representing the strongest practitioner-rated dimension. This finding is particularly significant as it confirms that the game-based, multimodal design of the PITA model is especially effective at addressing the motivational deficits identified in conventional PJOK learning at the study site. The elevated engagement score underscores the practical contribution of the model in creating a more stimulating and participatory learning environment. Overall, this indicates that the PITA model is substantively appropriate, easy to implement, capable of increasing student motivation, and safe and comfortable for use in physical education (PJOK) learning in elementary schools.

The final product of the development in this research is a PITA-based learning model (Interactive, Thematic, and Active) for learning 10 ribbon models in grade V of elementary school. This model consists of three main components, namely a learning module containing ribbon material including basic techniques of 10 ribbon models packaged in text, image, and audio instruction formats; interactive learning media developed using the Canva and CapCut applications in the form of learning videos containing ribbon game technique visualizations with supporting narratives; as well as evaluation sheets and performance tests used to measure students' understanding of the material and basic movement skills that have been mastered.

Table 4. Ribbon Model Products

No	Model Name PITA	Short Description	The main purpose
1	Cross-winding Ribbon	Students walk/run along a zig-zag or circular ribbon path on the floor.	Agility, balance, concentration
2	Command Color Ribbon	Students perform movements according to the color of the ribbon they are instructed to perform.	Quick reaction, concentration, coordination
3	Creative Dance with Ribbons	Students dance freely using ribbons to the rhythm of the music.	Creativity, self-expression, coordination
4	Ribbon Relay	Team games involve carrying ribbons with various movements (running, crawling, jumping).	Speed, teamwork, stamina
5	Catch the Flying Ribbon	Students catch the thrown ribbon before it falls to the ground.	Quick reaction, eye-hand coordination
6	Ribbon Line Jump	Students jump over the ribbon line with a variety of jumps.	Leg strength, agility, balance
7	Ribbon Net	Students pass through the ribbon net without touching it.	Agility, strategy, concentration

8	Expression Ribbon War	Students express emotions/words through ribbon movements, the other team guesses.	Nonverbal communication, creativity, collaboration
9	Letter and Number Path	Students move following the shape of letters and numbers from the ribbon on the floor.	Literacy, numeracy, gross motor skills
10	Motion Waiting Tape	Students move only when given a command.	Focus, discipline, self-control

The development of this model is based on multimodal learning theory which states that the combination of visual, auditory, and practical elements can increase the effectiveness of learning. This is in line with Nieveen's opinion (in Trianto, 2007:8) which states that a good learning model must have logical theoretical validity, and is supported by Rahmadi Widdiharto (2004:3) who emphasized that an effective learning model must have a clear theoretical rationale and directed learning objectives. The final product of this research is packaged in the form of a digital module and learning video that can be used as a guide for teachers in implementing the PITA-based learning model in grade V of elementary school, and is expected to be able to improve students' understanding, skills, and motivation in learning 10 ribbon models more interactively and effectively.

Based on the results of the student response questionnaire in the small-scale and large-scale trials, the average percentage was 82% on the small scale and increased to 86% on the large scale. This indicates that students gave a very positive response to the PITA-based learning model. Students considered this model interesting, easy to understand, motivating, and helped them learn more actively and understand the material of the 10 ribbon models better. Thus, the PITA model was considered interesting, effective, and preferred by students in PJOK learning

Table 5. Results of the Analysis of the Effectiveness of the PITA Model in Small and Large Scale Trials

No.	Statement	Small Scale		Large Scale	
		Score	%	Score	%
1.	I think that the design of this learning model is interesting.	100	89	135	91
2.	I am able to practice the basic techniques of playing 10 ribbon models.	90	80	115	78
3.	I prefer to learn with this learning rather than just listen to the teacher's explanation	95	85	110	74
4.	This learning model gives me motivation to Study	92	82	138	93
5.	The presentation of material in the media is very complete	94	84	129	87
6.	With this learning model I gain knowledge more in-depth about the material of 10 ribbon models	105	94	130	88
7.	I can learn actively with this kind of learning model.	80	71	125	84
8.	I got to know additional information about the Game material. 10 ribbon models	89	79	139	94
9.	I can read the text easily because of the type and size. the selected letters vary	80	71	130	88
10.	I like the look of each media page because it has attractive color composition	100	89	127	86
11.	I can understand the material with the help of pictures, and	95	85	122	82

	audio contained in the media				
12.	The printed images are easy to understand and the colors are very attractive.	84	75	137	93
13.	The images presented are appropriate and support the clarity of the concept.	89	79	130	88
	Material				
14.	The sentences used are easy to understand	90	80	128	86
15.	The language used is communicative and interactive	95	85	119	80
	Average		82%		86%

DISCUSSION

The results of the development of the PITA (Interactive, Thematic, and Active)-based learning model show that this approach is able to present a variety of interesting, contextual, and appropriate physical education (PJOK) learning activities for fifth-grade elementary school students. The ten developed ribbon game models are designed to integrate movement, cognitive, affective, and social elements into a fun learning environment. This aligns with the characteristics of elementary school students who tend to learn more effectively through play and hands-on experience (learning by doing).(Lestari, 2021; Muhammad et al., 2024).

The Ribbon Crossing, Ribbon Line Jump, and Ribbon Net models specifically contribute to improving students' gross motor skills, balance, agility, and motor coordination. These activities require students to control body movements, regulate rhythm, and adjust body position to the environment, thus helping to develop body awareness and motor control. These findings align with motor development theory, which states that repeated movement practice in various situations can accelerate children's motor maturity.(Hidayatullah & Hasbi, 2021; Suryadin & Wahyuningsih, 2023; Wahidah et al., 2021).

Meanwhile, the Color Ribbon Command, Catch the Flying Ribbon, and Wait for Motion Ribbon models emphasize quick reactions, concentration, and self-control. These three games train students to respond appropriately to visual and verbal stimuli, wait for cues, and control motor impulses. This is crucial for developing student discipline, focus, and readiness to learn. From an educational psychology perspective, the ability to control oneself and focus attention is a crucial foundation for successful learning in the classroom (Baumeister & Vohs, 2007; Diamond, 2013; Mischel et al., 1989).

The Ribbon Dance Creation and Ribbon War Expression models strengthen students' affective and creative aspects. Both models provide space for students to express emotions, ideas, and imagination through body movements and ribbons. These activities not only develop coordination and flexibility of movement but also build self-confidence, courage to perform, and aesthetic sensitivity.(Suwitri et al., 2021; Tursina et al., 2022; Wahyuni & Muazimah, 2020)This supports the view that physical education focuses not only on physical fitness, but also on the development of students' personalities and self-expression.

The Ribbon Relay and Letter and Number Track models show excellence in the aspects of cooperation, communication and cross-subject integration. The Ribbon Relay fosters sportsmanship, responsibility and team solidarity, while the Letter and Number Track integrates PE learning with literacy and numeracy. This integration strengthens the thematic approach emphasized in the Indonesian Elementary School Curriculum, where learning does not stand alone, but is interconnected between fields of study, as mandated by Permendikbud No. 57 Tahun 2014 concerning the Elementary School Curriculum Framework and by the Merdeka Belajar curriculum guidelines

(Kemdikbudristek, 2022).

Overall, the development of 10 PITA game models provides an innovative alternative for physical education teachers in presenting more varied, enjoyable, and meaningful learning. This model is able to meet the needs of 21st-century learning, which emphasizes activity, creativity, collaboration, and active student involvement. With its flexible and easily modified characteristics, the PITA model has the potential to be applied not only in fifth grade but also can be adapted to other grade levels by adjusting the level of difficulty and complexity of the movements.

CONCLUSION

The ten PITA game models have been proven to accommodate the development of various aspects, including agility, balance, coordination, strength, quick reaction, concentration, creativity, cooperation, and the integration of literacy and numeracy. Thus, the PITA model not only contributes to improving physical fitness, but also supports character building, self-control, and student learning motivation. Overall, the PITA-based learning model can be used as an innovative alternative for Physical Education (PJOK) teachers in creating more interactive, thematic, active, and enjoyable learning. This model is also flexible for further development according to school conditions, student characteristics, and learning needs. Therefore, the implementation of the PITA model is expected to improve the quality of PJOK learning and provide a more meaningful learning experience for students. Recommendations for further research suggest that the PITA model be tested on a wider scale, involving more schools and different grade levels to determine the consistency of its effectiveness. Further research can also focus on measuring the impact of the PITA model on learning outcomes quantitatively, such as improvements in physical fitness, motor skills, and students' cognitive learning outcomes. In addition, the development of digital-based supporting media and the integration of interactive digital technology into the PITA model presents a promising avenue to align PJOK learning with 21st-century educational demands, building on the modelâ□□s established capacity for engagement and motivation.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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