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Developing Game-Based Animated Video Media to Increase Students' Learning Interest in Fundamental Skills Movement

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Abstract: This study aims to develop animated video-based game learning media to increase students' interest in learning Physical Education and Health, especially in the material of basic movement skills at SDN 3 Kintamani. The study was conducted as Research and Development (R&D) using the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation). The sample in this study comprised 20 third-grade students at SDN 3 Kintamani, selected using a total sampling technique. Meanwhile, one teacher and three experts were recruited as research subjects using purposive sampling. Data were collected through observation interviews, document analysis, and tests. The research instruments included: observation sheets, interview guides, document notes, and questionnaires. The collected data were analyzed using qualitative descriptive, quantitative descriptive, and paired-samples t-test. The results showed that animated video-based games are highly effective in increasing students' interest in learning, thereby classifying them as effective learning media. This is supported by the difference in mean scores between the pre-test and post-test. The mean score on the pre-test is 65.70, while the post-test achieves a higher mean of 86.45. The effect size was 3.649, categorized as a very large effect. This implies that animated video-based games strengthen game-based learning models and technology integration in learning basic movement skills.

Keywords: Animated Video; Fundamental Movement; Students' Learning Interest



INTRODUCTION

Education plays a significant role towards national development as occurs in Indonesia in which education has been settled in many regulations. Law Number 20 of 2003 frames Indonesian education as a conscious and well-structured effort to create a learning atmosphere and process that enables students to develop their potential (Amalia & Puspytasari, 2018). This perspective implies that education not solely focuses on academic or cognitive aspect but also emphasizes students' holistic development including their physical abilities and character (Andres, 2021; Simonton et al., 2021) In line with this holistic educational framework, learning outcome is expected to not only cover students' cognition but also psychomotor and affective domains (Baabdullah et al., 2022; Bannon et al., 2017). Therefore, educational stakeholders are demanded to design the learning process to facilitate students' balanced growth across these three domains to show the educational quality itself.

Physical Education (PE) is one of compulsory subjects commonly found in Indonesia education system. It has been designed to ensure that students not only comprehend the importance of health and physical fitness at theoretical level but also actively involved in physical activities developing their psychomotor skills and promote positive affective attributes (Apriyanto & Setiawan, 2021). Physical Education provides structured movement experiences for students to practice motor skills, improve physical competence, and internalize values, such as; discipline, cooperation, sportsmanship, and responsibility (Salters & Benson, 2022). In addition, Physical Education is crucial for elementary school level since the students are in a phase of rapid physical growth and development (Akbar & Hariyanto, 2022). It also highlights that PE significantly influences students' psychomotor development as well as their cognition and affective domains. It serves as a way for achieving national goals leading to a demand of conducting PE learning process which is systematically and comprehensively designed to promote students' physical growth , emotional intelligence, social skills, and character development from an early age (Mustafa, 2022).

Fundamental movement constitutes a core component in Physical Education learning promoting students' motor abilities, cognition, and affection (Barnett et al., 2016). These skills cover locomotor, non-locomotor, and manipulative movements

which function as the basis of acquiring more complex sport-specific skills in the next stages (Jefferson-Buchanan, 2022). (Bartolo et al., 2024) indicate that fundamental movement skills in Physical Education has pivotal role in early stage of studying which not only improves students' motoric competence but also enhances cognitive process by understanding movement concepts and strategies. It is added that fundamental skills movement also encourage students' affective aspects including discipline, cooperation, and sportsmanship (Rosmi, 2016; Yudaparmiya, 2022) Therefore, teachers are suggested to systematically design fundamental movement skills with innovative instructional media to ensure that the learning process is meaningful, effective, and enjoyable.

Instructional media has been regarded as a crucial component in the learning process including in Physical Education. It is mentioned that instructional media supports the learning process particularly in fundamental movement learning by assisting students to understand the concepts more concretely (Arisandi & Indahwati, 2023). An appropriate instructional media helps teachers to facilitate students in understanding the movement, developing the motor skills, and enhancing their physical fitness principles (Sasmitha & Suwirman, 2021). It is added that elementary school students often adequate innovative instructional media to embrace their interest and understanding towards the learning materials (Rejeki et al., 2020) An effective learning process in Physical Education also depends on the innovative instructional media which is applied by the teachers to optimize the students' learning process itself.

However, the preliminary observation at SDN 3 Kintamani shows that the teachers are still struggling in utilizing innovative instructional media in Physical Education learning process. The teachers mention that they face difficulty in designing the instructional media considering that they dominantly implement technology by using YouTube video to teach students particularly in delivering fundamental movement materials. It can be a serious problem considering that lack of innovation in learning process leads students to have low learning interest (Regina et al., 2024; Yuliansih et al., 2021). This limited use of instructional learning media at SDN 3 Kintamani indicates that a lack of innovation can create monotonous

learning experiences which is potential to increase their learning interest and influence their fundamental movement skills.

Learning interest is considered as a powerful motivation in education in which it penetrates all teaching and learning activities to enhance students' engagement as well as promote their learning outcomes (Wang et al., 2022). Environment is influential for students' learning interest in which its extinction brings a certain stimuli triggering their interest in learning reflected on their feeling of joys in doing something (Febrina & Setiawan, 2024) It is argued that students with high learning interest tend to have greater motivation and actively participate in the classrooms, meanwhile students with low learning interest is assumed to have low participation and motivation leading them to have low learning performance as well (Amelia & Harahap, 2021) Since learning interest is pivotal in the learning process, it is necessary for Physical Education teachers to pay more attention on this component to ensure students are successfully in learning fundamental movement skills.

Along with technological advancements, game-based animated videos emerges as an engaging and interactive instructional media which is regarded as an alternative for the current issue. Game-based animated video is an instructional learning medium providing students with animated videos which enables them to process the materials in more enjoyable ways (Gordillo et al., 2022) Animated videos transform learning materials into dynamic visuals combined with engaging audio visuals in which when they are assisted to game, it provides students with less monotonous learning (Damanik & Siregar, 2021). Applying game-based animated videos enables students to have adaptive learning experiences stimulating their curiosity and optimizing the learning quality.

Previously, many studies dominantly focus on investigating the effectiveness of animated videos and game separately particularly in elementary schools. It is reported that animated-based audio visuals developed for elementary school students are effective in improving their learning outcomes (Sulastri, 2020). It is added that animated-based audio visuals increase both students' learning interest and learning outcomes in Physical Education. Meanwhile, other studies discover that game-based learning is effective to encourage students to participate in physical activities as well as improve their learning outcomes in PE classrooms (Jannah et al., 2024; Vetter et

plan and design the prototype of game-based animated video for teaching fundamental movement skills in PE classrooms. The design was underlined by the analysis result. The prototype presented the learning objectives, game's plot or flow, and learning scenario. Development was the third stage of developing prototype into the real product. It was conducted by developing the prototype and involving the experts to validate and check the reliability of the developed product. The developed product was ensured for its validity and reliability to measure its quality before it was implemented to the subjects. Implementation was the stage where the developed product were distributed to the subjects. The developed product was implemented for teaching fundamental movement skills for third-grade students at SDN 3 Kintamani. Evaluation was the last step for ensuring the effectiveness of developed product in which it was conducted by distributing questionnaire to the teachers and conducting pre-test and post-test.

The data were collected through observation, interview, survey, document analysis, and test. The instruments used were observation sheet, interview guide, note, and test. There were 20 students involved as a research simple who were selected by using total sampling technique. Meanwhile there were one PE teacher, and two experts selected by using purposive sampling technique. The collected data were analysed qualitatively and quantitatively. Qualitative Data Analysis was used to analyse the qualitative data consisted of three steps; data reduction, data display, and conclusion drawing. Quantitative data were analysed by conducting descriptive quantitative and paired-samples t-test.

RESULT AND DISCUSSION

Result

The current study presented its findings into four sections to answer the research questions. Those were; 1) students' needs related to innovative instructional media in PE classrooms particularly in learning fundamental movement skills, 2) the development of game-based animated video to improve students' learning interest in fundamental movement skills, 3) the quality of developed product, and 4) the effectiveness of developed product in increasing students' learning interest. Each finding was elaborated as follows.

Students' Needs Related to Innovative Instructional Media in PE Classrooms Particularly in Learning Fundamental Movement Skills

The third-grade students at SDN 3 Kintamani were involved as research sample or subjects as well as the PE teacher. They were analysed for the needs related to innovative instructional media in PE classrooms particularly in learning fundamental movement skills. The analysis was conducted by obtaining the students' competence, characteristics, needs, and learning context and environment. Those results were presented in Table 1.

Table 1. Students' Needs Analysis Result

Aspects	Sources	Findings	Implication for Product Development
Students' Competence	Observation Interview	Students' fundamental movement skills and learning interest were varied and the PE classroom was not engaging yet for students.	An attractive Instructional media was required to attract students' learning interest.
Students' Characteristics	Observation Interview Document Analysis	Students learn best through movement, game, visuals, hands-on activities, and their social skills need to be developed.	Instructional media was supposed to be game-based, visual, and collaborative
Students' Needs	Observation Interview	Lack of technology involvement	Instructional media was supposed in the form of technological mean
School Context and Environment	Observation	The facilities are adequate, but instructional time and media were limited	Instructional media was supposed to be flexible, low-cost, and ease of use

The analysis showed that students' competence and learning interest were varied considerably. The observation reflected that several students demonstrated adequate interest in learning fundamental movement skills, while the others tend to have low engagement during the learning process. The PE teacher mentioned that it was a common situation during the learning process considering that they were also struggling in creating engaging learning atmosphere. In addition, it was found that the third-grade students at SDN 3 Kintamani learned enthusiastically through play-based activities, physical movement, visual stimulation, and direct experiences. Their social skills were still developing, especially in terms of cooperation and communication, which highlighted the importance of collaborative learning activities. These characteristics suggested that

learning media should be designed to accommodate diverse learning styles while supporting both motor and social development. Interviews with teachers indicated that PJOK instruction remained limited in terms of innovation and the integration of engaging learning media.

The PE teacher reported difficulties in increasing students' motivation using conventional approaches and emphasized the absence of game-based animated videos that systematically integrated movement learning with enjoyable activities. In terms of the school context, the learning environment was found to be generally supportive, with adequate facilities and class sizes that allow small-group activities. However, limited instructional time and a lack of relevant learning media posed challenges to effective implementation. Therefore, the developed product must be flexible, easy to use, and adaptable to various learning settings. These findings implied that students required simple, engaging, and developmentally appropriate learning media that integrate locomotor, non-locomotor, and manipulative movement skills. Consequently, the development of a game-based animated video was considered a suitable solution to enhance students' learning interest, collaboration, and engagement in fundamental movement learning.

The Development of Game-Based Animated Video to Improve Students' Learning Interest in Fundamental Movement Skills

The analysis clearly showed that there was a need of innovative instructional media in enhancing students' learning interest in which the instructional media was supposed to simple, engaging, integrating technology, flexible, and easy to use. This result was used to design a game-based animated video as the solution for the current problem. The design was presented in Table 2.

Table 2. The Design of Developed Product

Components	Description
Product Name	Game-Based Animated Video "Colored Ball and Picture Matching"
Game	Colored Ball and Picture Matching Relay
Movement Elements	Locomotor, Non-Locomotor, and Manipulative Movements
Academic Content	Reading and matching colors or pictures
Game Type	Emphasizing group cooperation
Game Objectives	To develop learning interest, team work, responsibility, and students' ability in fundamental movement skills
Materials and Media	Papers contained sport names and pictures of sport equipment
Starting Rule	The game started with a long whistle signal

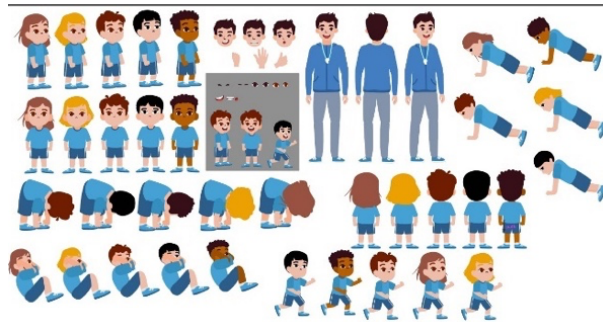
Station 1	The first player took a paper containing a predetermined sport name
Station 2	The second player received and passed the paper to the next station
Station 3	The third player received the paper and prepared for the matching activity
Matching Rule	The player stood and matched the sport name with appropriate picture provided
Success Criteria	The group that first correctly matched six pairs of sport names and pictures was declared the winner
Learning Outcome	An active, enjoyable, and interactive learning experience enhanced students' learning interest

Table 2 presented the product design that was in the form of game-based animated video “Coloured Ball and Picture Matching”. It was developed as an innovative instructional medium for teaching fundamental movement skills in PE classrooms. The product combined two movement-based games integrating locomotor, non-locomotor, and manipulative skills with academic content such as reading and picture matching. The learning design emphasized active participation, teamwork, and responsibility through a relay-based game structure involving multiple stations. In the Picture Matching Relay game, students worked collaboratively to relay sport-name cards and match them with corresponding images of sports equipment, created a learning experience that was enjoyable, interactive, and challenging. Overall, this product was designed to enhance students’ learning interest while supporting both physical movement development and cognitive engagement in Physical Education lessons.

The development was conducted as a concretizing process of the designed product. Transforming all components of “Coloured Ball and Picture Matching” was the initial stage of development in which the objectives and principles of Merdeka Curriculum were also used as the foundation. The game-based animated video was developed by using Adobe Premiere Pro to ensure that the product was flexibly accessed through laptop or smartphone. Adobe Premiere Pro 2025 was selected because it was a leading professional video production and editing software with advanced capabilities in video compositing, cutting, visual effects, animation, and sound design. These features strongly supported the creation of high-quality animated videos with dynamic pacing and a motivating viewing experience for students. In addition, every component of product was developed as follows.

Character Development

In the character development process, the animated characters were developed to reflect the characteristics of elementary school students. It aimed at ensuring that the animation appeared visually appealing and engaging for the students.



Picture 1. The Character Development

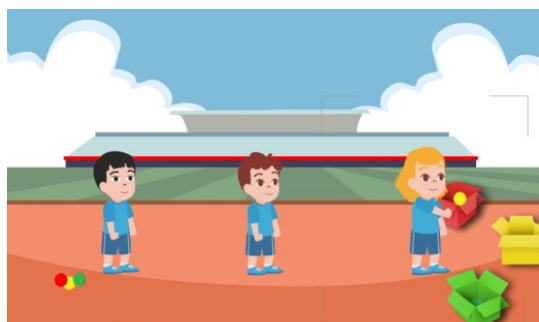
Based on Picture 1, there were six characters developed in this study. There were five elementary students and one teacher. Those characters were supposed to give authentic experiences for the students when they played the game. It led them to have a real virtual learning condition.

Background Development

The background development was conducted by imitating the environment at SDN 3 Kintamani. Both of the games used the same backgrounds. There were two main backgrounds as presented in the following pictures.



Picture 2. Coloured Ball



Picture 3. Matching Pictures

Both of the pictures indicated that the games used the field of the school as the background. In addition, the players were able to change the background with the others since the product was developed with five background options including the backyard of school as the background.

Final Development

The development was finalized by adding the dialog voice in which dubbing was used to complete the conversation between the teacher and students. After completing the audio, the components were combined with the materials related to fundamental movement skills. The final product was continued to be evaluated and revised before it was implemented.

The Quality of Game-Based Animated Video to Enhance Students' Learning Interest in Fundamental Learning

The developed product was assessed for its quality by investigating its validity and reliability before it was implemented to the third-grade students at SDN 3 Kintamani. The validity and reliability were assessed by conducting expert judgements. The results were presented in Table 3.

Table 3. The Expert Judgement Result

Aspects	Indicators	Averages	Percentages	Category
Content	10	4.4	88%	Excellent
Media	16	4.5	90%	Excellent
Language	10	4.4	88%	Excellent
	Total	4.4	89%	Excellent

Based on Table 3, the expert judgement was conducted by involving content experts, media experts, and language experts. The results of the expert validation indicated that the game-based animated learning video was highly feasible for use in PE learning at the elementary school level. In terms of the content, the product demonstrated strong alignment with the PJOK basic competencies, students' motor development stages, and learning objectives. The game effectively encouraged active physical movement, ensured student safety, and supported the development of fundamental movement skills. In addition, the game design was easy to manage by teachers, utilized affordable and accessible equipment, and could be implemented in various classroom or field conditions, resulting in a high average score.

Regarding to its media or visual aspect, the animated video showed excellent quality in colour selection, image size, composition, and background clarity. The animations were visually engaging, supported by appropriate placement of images and text. Furthermore, the use of sound effects and background music was relevant and clear, enhancing students' interest and learning experience. The duration of the video was appropriate to the presented material, and the media was easy to access across different devices, contributing to a very high feasibility rating. Meanwhile, the language aspect indicated that the instructional content was delivered using clear and effective sentence structures that accurately conveyed the intended messages. The language use was grammatically correct, communicative, and appropriate for students' cognitive and emotional development levels. The clarity of spoken explanations, correct spelling, and use of standard language facilitated students' understanding and maintained their attention throughout the learning process. Overall, the validation results across all indicators confirmed that the developed media was pedagogically sound, visually engaging, and linguistically appropriate for third-grade PE instruction.

The Effectiveness of Game-Based Animated Video in Enhancing Students' Learning Interest in Fundamental Learning

An experimental study was conducted through pre-test and post-test. The pre-test was conducted before the treatment given to the experimental group. Both of experimental and control groups were distributed a questionnaire to check their learning interest in PE classrooms particularly in learning fundamental movement skills. Post-test was conducted after the experimental group was taught by using game-based animated video meanwhile the control group was taught conventionally. The data gained from pre-test and post-test were analysed through paired-samples t-test. The result was presented in Table 4.

Table 4. Paired-Samples Statistic Result

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Posttest	86.45	20	4.524	1.012
	Pretest	65.70	20	5.322	1.190

Descriptively, the paired-samples statistic indicated that there was a mean difference between pre-test and post-test. It was revealed by the mean score of pre-test which was 65.70 and post-test was 86.45. The difference between the pre-test and post-test mean

scores indicated an improvement in students' learning interest during the implementation of developed product. In addition, this result was supported by the significant correlation between the two groups, as presented in Table 5.

Table 5. The Result of Paired Samples Correlations Test

Pair 1		N	Correlation	Sig.
	Posttest & Pretest	20	.738	<.001

Based on Table 5, it was found that there was a significant relationship between the pre-test and post-test scores. The correlation coefficient value of 0.738 with a significance level of $p = 0.001 (< 0.05)$ suggested that students' initial learning interest was associated with their achievement after the treatment, despite the significant improvement observed. This finding indicated that students with higher initial learning interest tend to demonstrate greater learning interest after using the developed media. To examine whether the difference in mean scores was statistically significant, a paired samples t-test was conducted. The result of this test was presented in Table 6.

Table 6. The Result of Paired Samples T-Test

Pair 1	Posttest - Pretest	Mean	Std Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
		20.750	3.640	.814	19.046	22.454	25.493	19	<.001

The results presented the mean difference found in the paired samples t-test with t-value of 25.493, with $df = 19$ and a significance value of $p = 0.001 (< 0.05)$. It concluded that the developed game-based animated video learning on fundamental movement skills had a significant effect on improving students' learning interest. In addition, the effect size was calculated to assess the magnitude of its impact on students' learning interest, as presented in Table 7.

Table 7. The Effect Size Test Result

Pair 1	Posttest - Pretest	Standardizer	Point Estimate	95% Confidence Interval		
				Lower	Upper	
		Cohen's d	3.640	5.700	3.846	7.545
		Hedges' correction	3.714	5.587	3.769	7.395

The results showed a Cohen's d value of 3.640 with a Hedges' g correction of 3.714. Referring to Cohen's (1988) criteria, an effect size of 0.8 or higher was categorized

as large. Thus, an effect size was greater than 3.0 indicating that the developed game-based animated video had a very large effect on students' learning interest. It implied that the developed product was effective and significantly influenced students' learning interest.

Discussion

The findings confirmed that students demonstrated strong needs for an innovative instructional media integrating technology with game-based learning. This finding supported the implementation of game-based learning model enhancing students' engagement reflected on their interest and achievement in learning (Sofiana & Mubarok, 2020; Wang et al., 2022). It also aligned with the broader literature mentioning that animated learning media was attractive for students in which it led them to a meaningful, enjoyable, and movement-rich learning experience (Sulastri, 2020). This finding indicated that active participation of the students depending on the instructional media used in the classrooms. The needs of game-based animated video proved that technology integration was significantly influence the learning quality itself (Merta et al., 2023)

The development of game-based animated video focused on students' needs and Merdeka curriculum supported the emphasize of students-centred learning (Islam et al., 2022; Riyan Rizaldi & Fatimah, 2022). It was designed to provide contextual and competency-based learning through technological integration. It was also found that the development has similarity with previous studies that also developed instructional learning media based on students' characteristics, learning context, and environment (Gordillo et al., 2022; Mahayanti et al., 2020; Sari et al., 2025) It also supported the implementation of animated video in the learning process particularly in PE classrooms which improved students' learning quality Miratunnisah et al., (2024);Muna & Wardhana., 2021). In the context of physical education, the developed product provided an interactive learning approach which was previously regarded as a key determinant of learning success in active domains such as; fundamental movement skills.

These findings provided several important implications for instructional practice, curriculum implementation, and future media development in physical education. The integration of game-based animated video as an instructional medium demonstrated the potential of technology-enhanced learning to support active, student-centred learning environments, particularly in movement-based subjects such as Physical Education. For

teachers, this media could be served as an alternative instructional tool to foster students' learning interest, engagement, and active participation during the learning process. From a curricular perspective, the developed media aligned with the principles of the Merdeka Curriculum by promoting contextual, competency-based, and flexible learning experiences tailored to students' characteristics and needs. Furthermore, this study provided practical insights for instructional designers and educators in developing learning media that integrates animation, game elements, and physical activities to enhance learning quality. In fact, the developed game-based animated video was considered a strategic approach to improving instructional effectiveness and learning experiences in PE classrooms.

However, the current research was limited to a relatively small sample size in a single educational context. It limited the generalizability of the findings to other populations or subjects. In addition, the study was designed to focus short-term outcomes. Therefore, long-term effects of the media on sustained learning interest and skill acquisition remain unexplored. Future research should employ larger and more diverse samples, include follow-up assessments to examine lasting impacts, and consider qualitative data (e.g., interviews or focus groups) to capture deeper insights into students' perceptions and experiences with game-based animated learning media.

CONCLUSION

In conclusion, the current study shows that developing game-based animated learning is effective to improve the learning interest of third-grade students at SDN 3 Kintamani. It is supported by the quality of developed product which achieves excellent category with significant value $< .05$ indicating that game-based animated video is effective in increasing students' learning interest. It is added that the developed product brings a very large effect size on students' learning interest. It is suggested for other researchers to conduct further study in long-term effects for a deeper insight.

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