



Development and Expert Validation of Traditional Game-Based Digital Infographic Learning Media for Fundamental Movement in Elementary School Students

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Abstract

Study purpose. This study aimed to develop and validate digital infographic learning media for fundamental movement learning based on traditional games among elementary school students.

Materials and methods. The study used a modified Research and Development (R&D) model consisting of needs analysis, design, development, expert validation, revision, and product prototype. The media content was based on Pat Ni Gajah, a traditional game using coconut shells connected with ropes. Data were collected through content analysis, media design documentation, expert validation sheets, and product revision notes. Three validators were involved: a PJOK content expert, a digital learning media expert, and an elementary school PJOK practitioner. Qualitative data were analyzed descriptively, while quantitative validation scores were analyzed using Aiken's V coefficient.

Results. The product was a digital infographic prototype containing game identity, learning objectives, equipment and play area, locomotor, non-locomotor, and manipulative movement demonstrations, a digital observation rubric, and four character values: self-confidence, enthusiasm, hard work, and discipline. Expert validation produced an overall Aiken's V of 0.79, categorized as valid. The relevance of PJOK content and character-value integration reached high validity ($V = 0.90$), while movement demonstration clarity, visual design, observation rubric suitability, and local-wisdom relevance were valid ($V = 0.73-0.75$).

Conclusions. The digital infographic learning media prototype has adequate content validity and can proceed to product revision before limited classroom trials.

Keywords: Digital Infographic, Fundamental Movement, Traditional Games, Physical Education, Expert Validation

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Introduction

The use of digital media in the teaching of Physical Education, Sports, and Health (PJOK) can no longer be understood as merely supplementary. In the practice of teaching, PJOK teachers often face a rather unique situation: movement material must be explained clearly, students need to see correct movement examples, and teachers still need to observe students' performance directly. In such conditions, digital media can help teachers present movement information more concisely and understandably. However, digital media in PJOK is not enough to be merely visually appealing. The media need to have a clear pedagogical function, such as helping students understand the sequence of movements, providing safety instructions, offering observation indicators, and connecting physical activities with character values.

Recent studies on digital technology in physical education show that the use of digital media can support learning in the physical, cognitive, social, and affective domains, but the benefits highly depend on how technology is integrated into the learning design (Jastrow et al., 2022). In other words, the main issue is not just whether teachers use technology, but whether that technology truly helps achieve learning objectives. In the context of PJOK, digital media should not replace physical activities, but rather support them. During practice, media such as video recordings enable students to independently observe and analyze their own movements with less reliance on direct teacher guidance (Greve et al., 2022). After practice, media can serve as reflection material, supporting both "reflection in action" and "reflection after action" as students revisit and evaluate their performance (Hall & Gray, 2016; Zhou et al., 2025). This framework of thought is important so that the use of technology remains in line with the character of PJOK as a body-experience-based learning.

One form of digital media that is relatively simple and realistic for teachers to use is digital infographics. Infographics have the advantage of presenting information in a concise, structured, and easy-to-read visual format. In learning, infographics can help students understand material that requires sequencing, relationships between parts, and information grouping. Several recent studies show that digital-based infographics can enhance engagement, conceptual understanding, and learning interest because information is presented through a combination of text, icons, images, colors, and concise layouts (Ramadhan et al., 2024; Ristanti & Isdaryanti, 2024). In the context of physical education, previous development studies have also shown that digital and technology-based learning media can support teachers in presenting movement or fitness content more clearly and attractively (Darmawan et al., 2024; Maulana et al., 2023). For PJOK, the strength of infographics lies in their ability to present a series of movements gradually, so that students not only receive verbal instructions but also obtain visual guidance before performing activities.

However, the development of digital media for PJOK should not be detached from the cultural context and the character of the students. PJOK has a wide space to connect movement, social interaction, and life values. One of the learning resources that can be used is traditional games. In many elementary school contexts, traditional games can be activities that are close to children's lives, easy to modify, and do not always require expensive facilities. Recent research also shows that traditional games and game-based models contribute to basic motor skills, learning motivation, social skills, character building, and the practicality of fundamental movement learning in elementary school students (Aliriad et al., 2023; Aprriyadi et al., 2026; Irmansyah et al., 2020; Mujriah et al., 2022). This means that traditional games are not only a

means of cultural preservation but can also serve as a source of meaningful physical education content. Pat Ni Gajah is one of the traditional games that can be interpreted as a source of PJOK learning because it involves locomotor activities, stability, coordination, and object control. In this development, the game is mapped into several more representative movement activity codes, namely locomotor, non-locomotor, and manipulative codes (Dewi et al., 2022). Each type of movement also contains character values, especially self-confidence, enthusiasm, hard work, and discipline. These elements show that Pat Ni Gajah has the potential to be developed into digital learning content. However, that potential is not enough if it is only explained narratively. Teachers need a presentation format that is more practical, concise, and easy to use in teaching. This is where digital infographics become a relevant choice.

The need for digital infographics for Pat Ni Gajah also arises from practical issues in movement learning. When teachers teach traditional games, movement explanations often rely on direct demonstrations. Direct demonstrations are indeed important, but not all teachers have enough time to explain each variation repeatedly. Additionally, students often need visual guides that they can refer back to before performing activities, as visual cues have been shown to help learners imitate movements more effectively when instruction is not delivered in person by a teacher (Yao et al., 2022). Digital infographics can help address this issue by presenting movement demonstrations in the form of visual sequences, brief descriptions, and indicators of movement success. Infographics can also include digital observation rubrics to make it easier for teachers to assess movement and character aspects in a targeted manner.

The digital observation rubric has become an important part of this development. In PJOK learning, observation is often done quickly when students are moving. If the observation indicators are unclear, the assessment can become too general and less helpful in the feedback process, since clear and explicit criteria are what allow a rubric to provide transparency and support meaningful feedback in the first place (Panadero et al., 2023). Digital observation rubrics can help teachers assess more specific aspects, especially locomotor, non-locomotor, and manipulative movement (Dewi et al., 2022), as well as character aspects such as self-confidence, enthusiasm, hard work, and discipline (Adha et al., 2025). This rubric does not have to be a complex application. In the initial stage, the rubric can be structured in a simple digital format, such as a fillable table, an online form, or a spreadsheet-based observation sheet. In this way, the ICT elements in PJOK remain realistic and can be applied by teachers.

Based on the description, this research aims to develop and conduct expert validation of digital infographic learning media for fundamental movement based on traditional games for elementary school students. The focus of the development is directed toward three main components, namely movement demonstrations, digital observation rubrics, and the integration of character values. The novelty of this research lies in the effort to transform traditional games that involve fundamental movements into digital infographic learning media with visual structures, observation indicators, and character content. In this article, Pat Ni Gajah is presented as an example of a traditional game used as the basis for content development. Thus, this research not only discusses the benefits of traditional games but also offers a digital media design that can help teachers present movement learning in a more directed, simple, and contextual manner.

Materials and methods

Study participants

The participants in this study were three expert validators involved in assessing the content validity of the digital infographic learning media prototype. The validators consist of one PJOK content expert, one digital learning media expert, and one elementary school PJOK teacher/practitioner. The three validators were purposively selected based on the alignment of their expertise with the focus of the developed product, which is digital infographic media for

fundamental movement learning based on traditional games. Elementary school students in this study are placed as media users, not as participants in the learning experiment. Thus, this research does not directly test the effectiveness of the media on students' learning outcomes, motor skills, or character. The focus of the research is limited to prototype development, expert validation, and product revision. This limitation is made because the product is still in the early stages of development and needs to obtain expert evaluation before being used in limited learning trials.

Study organization

This study used the Research and Development (R&D) method with a modified development model. This model is adapted from the principles of development research that emphasize the processes of needs analysis, design, product development, expert validation, revision, and product prototype preparation (Sugiyono, 2019). Similar R&D procedures have been used in physical education and sport learning product development, including training aids, digital teaching materials, and technology-based learning media (Abadi & Haris Satria, 2022; Darmawan et al., 2024; Maulana et al., 2023). Modified procedures were used because this research has not yet been directed toward a full pedagogical experiment, but rather toward the initial development of digital infographic learning media that is content-valid.

The research organization consists of six main stages. The first stage is analysis, which is conducted to identify the learning needs of elementary school PJOK and to review the content of the Pat Ni Gajah game as a basis for traditional games. At this stage, the analysis is directed toward fundamental movement elements, game tools, simple rules, character values, and the possibility of presenting content in the form of digital infographics. The second stage is design, which involves the initial media design that includes information structure, visual layout, illustration choices, instructional text, various fundamental movements, and digital observation indicators.

The third stage is development, which involves the production of a digital infographic learning media prototype. At this stage, the initial design is transformed into a digital visual product that includes the game's identity, learning objectives, play tools and space, locomotor movement variations, non-locomotor movement variations, manipulative movement variations, digital observation rubrics, and character values. The fourth stage is expert validation, which involves the assessment of the prototype by PJOK content experts, digital learning media experts, and PJOK teachers/practitioners. Validation is conducted to evaluate the material's appropriateness, clarity of movement demonstrations, visual readability, suitability of digital observation rubrics, integration of character values, and relevance to local wisdom.

The fifth stage is product revision. Revisions are made based on the scores and comments of the validators, particularly on aspects of visual readability, simplification of movement demonstrations, practicality of the observation rubric, strengthening the identity of the Pat Ni Gajah game, and the addition of safety notes. The sixth stage is the product prototype, which is a digital infographic learning media that has been revised based on expert validation results. The research organization flow is presented in Figure 1.

Statistical analysis

Data were analyzed descriptively. Qualitative data in the form of content analysis results and expert comments were analyzed through reduction, grouping, and interpretation to improve product design. Quantitative data from expert validation sheets were analyzed using the Aiken's V coefficient to determine the content validity of the digital infographic learning media (Aiken, 1985). The use of Aiken's V is appropriate for expert-based content validation because it quantifies the level of expert agreement on the relevance of each assessed item or aspect, as also applied in sport training model validation studies (Suratman et al., 2026). Data processing

was carried out by tabulating the validator scores, calculating the s value for each assessment, summing the s values, calculating the Aiken's V coefficient, and interpreting the results based on validity categories.

Aiken's V is calculated using the following formula:

$$V = \frac{\sum S}{n(c - 1)}$$

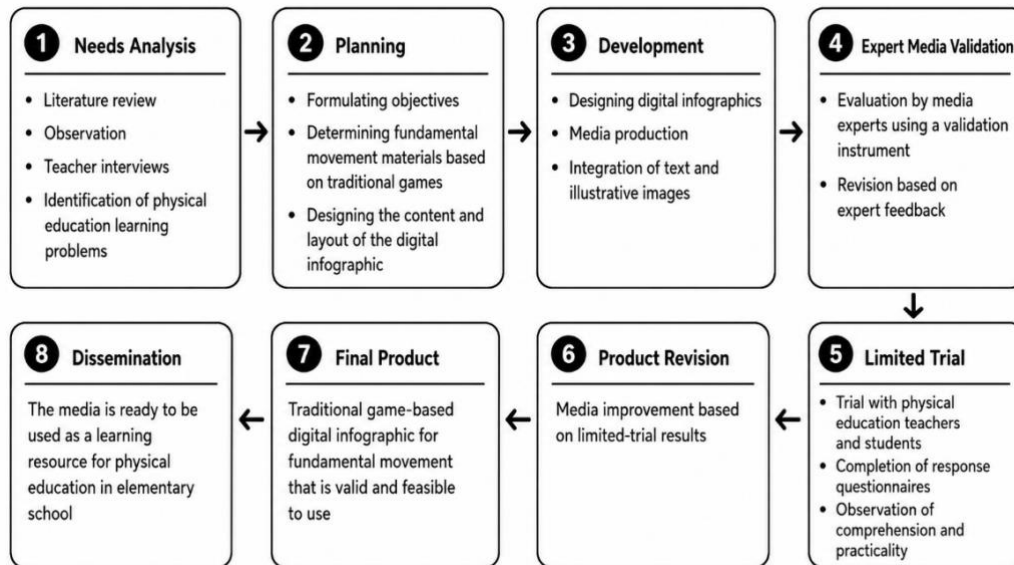


Figure 1. Research Design Flow for Developing Digital Infographic Learning Media Based on Traditional Games.

With the explanation $s = r - lo$, r is the score given by the validator, lo is the lowest score on the assessment scale, n is the number of validators, and c is the number of assessment categories. In this study, expert assessment used a five-point Likert scale, so $lo = 1$ and $c = 5$. The value of the V coefficient ranges from 0 to 1. The higher the V value, the stronger the level of expert agreement on the validity of the assessed aspect. The interpretation criteria used are $V > 0.80$ as high validity, $0.60 \leq V \leq 0.80$ as valid, and $V < 0.60$ as needing revision.

Expert validation scores were tabulated using spreadsheet software to obtain the average score and Aiken's V value for each validation aspect. The analysis results were then presented in a table containing the validation aspects, number of validators, assessment scale, average score, Aiken's V value, and validity category. The results of open comments from validators were used to qualitatively explain product revisions.

Results

Design of Digital Infographic Media for Fundamental Movement Games.

The development process resulted in a prototype of digital infographic learning media for fundamental movement based on traditional games for elementary school students. This prototype is designed by transforming the movement content in the Pat Ni Gajah game into a visual format that is easy to read by teachers and students, both before, during, and after the movement practice. This infographic is not intended to replace physical activities, but serves as

a visual guide to help teachers explain the sequence of movements, introduce observation indicators, and connect movement tasks with character values.

The structure of the digital infographic media content consists of six main elements, namely game identity, learning objectives, tools and play space, movement demonstration, digital observation indicators, and character values. Each element is arranged to keep the media simple, easy to read, and not too dense. The identity of the game and the learning objectives are placed at the beginning to help teachers explain the context of the activity. The movement demonstration section is the core of the infographic because it translates the sequence of movements into three fundamental movement variations. Observation indicators and character values are placed after the sequence of movements so that they can be used by teachers when students practice.

The design results show that digital infographic learning media can organize traditional games into a clearer fundamental movement learning flow. Pat Ni Gajah is not only presented as a traditional game but is positioned as digital learning content that includes various fundamental movements, observation points, and character values. This structure is important because teachers need media that is practical, visually clear, and can be directly related to classroom use.

Table 1. Content Structure of the Digital Infographic Media Prototype

Component	Content in the Prototype	Learning Function
Game identity	Game name, local-wisdom basis, target users, and PJOK learning context	Introduces the learning context and cultural background of the game
Learning objectives	Fundamental movement skills and character values to be developed	Clarifies the expected learning outcomes
Equipment and play area	Coconut shells connected with ropes, simple track, ball, area markers, and open play area	Helps teachers prepare activities using simple and accessible equipment
Movement demonstration	Locomotor Movement Variety, Non-Locomotor Movement Variety, and Manipulative Movement Variety	Helps students understand types of fundamental movements before practice
Digital observation indicators	Movement and character indicators that can be transferred into a digital form or spreadsheet	Supports teachers in conducting observation and giving feedback
Character values	Self-confidence, enthusiasm, hard work, and discipline	Integrates affective learning into physical activity

Mapping of Movement Demonstration

The movement demonstration section is developed from the traditional game Pat Ni Gajah, which uses coconut shells connected by a rope. The coconut shells are pinched or stepped on with the feet, while the rope is used as a grip to help maintain balance when students walk. Based on the characteristics of the movements, the demonstrations in the infographic are categorized into three basic types of movements, namely Locomotor Movements, Non-Locomotor Movements, and Manipulative Movements.

The mapping shows that each type of movement requires different visual emphasis. Locomotor Movement Variants need to display the direction of movement, step rhythm, and the use of ropes as grips. Non-Locomotor Movement Variants require clearer posture illustrations because their main tasks are related to balance and body control. Manipulative

Movement Variants require visual cues about object control, direction changes, and kicking movements. Therefore, the movement demonstration section in the infographic is designed using brief instructions, directional arrows, and simple visual sequences so that the movement tasks can be understood without lengthy verbal explanations.

Table 2. Movement Demonstration Mapping for the Digital Infographic Prototype

Movement Code	Movement Variety	Movement Objective	Equipment/Facility	Visual Demonstration Focus
LOK-1	Locomotor Movement	Walking forward using coconut shells with ropes	Coconut shells with ropes and a simple track	Foot position on the coconut shells, rope grip, and step direction
LOK-2	Locomotor Movement	Walking along a simple track	Coconut shells with ropes and track	Step rhythm, balance during movement, and track direction
LOK-3	Locomotor Movement	Walking around area markers	Coconut shells with ropes and area markers	Direction change, step control, and use of ropes as hand support
NON-1	Non-Locomotor Movement	Standing in balance on coconut shells	Coconut shells with ropes	Body position, foot support point, and balance control
NON-2	Non-Locomotor Movement	Controlling body posture while pulling the ropes	Coconut shells with ropes	Body stability, hand position, and rope-foot coordination
NON-3	Non-Locomotor Movement	Maintaining balance while stopping or changing body position	Coconut shells with ropes	Postural control, body transition, and safe positioning
MAN-1	Manipulative Movement	Directing the ball forward while maintaining balance	Coconut shells with ropes and ball	Ball direction, foot position, and body control
MAN-2	Manipulative Movement	Performing simple ball dribbling using the feet	Coconut shells with ropes, ball, and track	Ball control, step rhythm, and movement coordination
MAN-3	Manipulative Movement	Kicking the ball toward a target	Coconut shells with ropes, ball, and target	Kicking accuracy, target direction, and body balance

Note. LOK = locomotor, NON = non-locomotor, and MAN = manipulative.

Figure 2. Prototype of Digital Infographic Learning Media for Fundamental Movement Based on Traditional Games



Figure 2 presents the prototype of the digital infographic learning media. The prototype includes game identity, learning objectives, equipment and play area, movement demonstrations, a digital observation rubric, and integrated character values.

Digital Observation Rubric

The digital observation rubric is designed as a simple assessment guide that can be transferred into digital tables, spreadsheets, or online forms. This rubric is not intended to replace the professional judgment of teachers, but to help make observations more focused. The rubric combines three fundamental movement indicators and four character indicators because this media was developed for character-based PJOK learning.

Table 3. Digital Observation Rubric for Fundamental Movement Games

No.	Aspect	Observation Indicator	Scale
1	Locomotor movement	Students are able to perform movement that involves changing place using coconut shells with ropes, such as walking forward or following a track according to game instructions	1–5
2	Non-locomotor movement	Students are able to maintain balance, control body posture, and hold body position while standing on coconut shells	1–5
3	Manipulative movement	Students are able to control, direct, dribble, or kick the ball according to the direction and purpose of the activity	1–5
4	Self-confidence	Students show courage to try, repeat, and improve movements during the game	1–5
5	Enthusiasm	Students show enthusiasm, positive energy, and active participation in the game activity	1–5
6	Hard work	Students show effort, persistence, and willingness to repeat movements even when they experience difficulty	1–5
7	Discipline	Students follow the game rules, activity sequence, turns, and safety instructions	1–5

The digital observation rubric is structured using a 1–5 Likert scale to make the assessment more detailed and easier for teachers to apply. A score of 1 indicates that the observed aspect is in the very low category, while a score of 5 indicates that the aspect is in the very high category. With this format, teachers can assess movement and character aspects more concisely, and then transfer the results into a spreadsheet, digital form, or class observation recap.

Integration of Character Values

Character values are integrated into infographics through movement instructions, observation indicators, and brief reflection sentences. Character integration is not designed as a moral message separate from physical activities. Each value is linked to the physical tasks performed by the students. Confidence is associated with the courage to try movements using a rope-tied coconut shell. Enthusiasm is associated with active involvement in the game. Hard work is associated with the willingness to repeat movements when students are not balanced or not precise. Discipline is associated with adherence to game rules, turns, and safety.

Table 4. Integration of Character Values in Digital Infographic Content

Character Value	Movement Context	Representation in the Digital Infographic	Teacher Observation Focus
Self-confidence	Trying to walk, maintain balance, or control the ball using coconut shells with ropes	Short message: “Perform the movement confidently and safely”	Students are willing to try and repeat the task
Enthusiasm	Actively participating in movement game activities	Visual cue showing active involvement	Students show energy and positive involvement
Hard work	Repeating difficult movement tasks until they improve	Reflection prompt: “Repeat the movement until it improves”	Students keep trying after making mistakes
Discipline	Following the sequence, rules, turns, and safety procedures	Rule box and safety note in the infographic	Students follow the rules and wait for their turn properly

Character integration shows that the infographic prototype not only serves as a visual explanation of movement. This media also serves as a reminder for teachers and students that movement learning involves attitude, effort, courage, and adherence to rules. In this design, character values are embedded within the activity structure so that students can experience them while performing movement tasks.

Expert Validation with Aiken's V

Expert validation was analyzed using the Aiken's V coefficient. This technique was used to assess the level of agreement among experts regarding the content validity of the digital infographic learning media prototype. Aiken's V has been used in sport science research to determine the content validity of expert-assessed programme or model items (Suratman et al., 2026). Validation was conducted on six aspects, namely the suitability of PJOK material, clarity of movement demonstrations, visual design and readability, suitability of the digital observation rubric, integration of character values, and relevance of local wisdom. Scores were given using a 1–5 Likert scale.

Table 5. Expert Validation Results Using Aiken's V

Validation Aspect	Mean Score	Aiken's V	Category
Relevance of PJOK content	4.58	0.90	High validity
Clarity of movement demonstration	4.00	0.75	Valid
Visual design and readability	3.92	0.73	Valid
Suitability of the digital observation rubric	4.00	0.75	Valid
Integration of character values	4.58	0.90	High validity
Relevance of local wisdom	4.00	0.75	Valid
Overall mean	4.18	0.79	Valid

Note. Number of validators = 3; rating scale = 1–5.

The expert validation of the digital infographic learning media prototype produced an overall Aiken's V value of 0.79, which falls into the valid category. Two aspects reached high validity, namely the relevance of PJOK content and the integration of character values, each with an Aiken's V value of 0.90. Meanwhile, movement demonstration clarity, visual design and readability, suitability of the digital observation rubric, and relevance of local wisdom were categorized as valid. These results indicate that the prototype has adequate content validity and can proceed to product revision before limited classroom trials.

Table 6. Summary of Expert Feedback and Product Revision

Expert Feedback	Product Revision	Revised Component
Movement demonstrations need to be simplified.	Movements were grouped into Locomotor, Non-Loocomotor, and Manipulative Movement Varieties.	Movement demonstration
The display is still too dense.	Text was shortened, spacing between sections was widened, and section titles were clarified.	Visual design
The observation rubric needs to be more practical.	The rubric was simplified into seven aspects using a 1–5 Likert scale.	Digital observation rubric
Character values are too many.	Values were focused on self-confidence, enthusiasm, hard work, and discipline.	Character integration
Game identity needs to be clarified.	A description of Pat Ni Gajah as a coconut-shell-and-rope traditional game was added.	Game context
Safety aspects are not yet visible.	Safety notes on equipment, play area, and student turns were added.	Safety instructions

In general, the development results show that the digital infographic media prototype consists of three main elements: movement demonstration, digital observation, and character integration. Expert feedback was used to improve visual readability, simplify the observation rubric, clarify the game identity, and add safety notes to the prototype.

Discussion

The development results show that digital infographic media can be a realistic form of media to support fundamental movement game learning in PJOK. The main finding in this research does not lie in the sophistication of technology, but in how movement content, observation indicators, and character values are arranged into visual media that are easier for teachers to use. This is important because the use of technology in physical education does not always have to take the form of complex applications. Simple digital media can still hold pedagogical value if it helps teachers explain movements, directs students' attention, and provides a clear basis for observation.

These findings are in line with the study by [Jastrow et al. \(2022\)](#), which emphasizes that digital technology in physical education needs to be integrated into a clear learning design. They are also consistent with [Darmawan et al. \(2024\)](#), who showed that technology-based

media can enrich physical education learning, and [Maulana et al. \(2023\)](#), who developed digital teaching materials for elementary school PJOK. In the context of this research, digital infographics are not positioned as a substitute for physical activity, but rather as a support for physical activities. This media helps teachers display the sequence of movements before practice, provides observation references during practice, and offers reflection materials after practice. In this way, technology remains connected to the physical experience of students, rather than turning PJOK learning into a passive activity in front of a screen.

The use of Pat Ni Gajah as the content basis also shows that traditional games can be developed into digital materials without losing their movement context. This game uses coconut shells connected by a rope, which are then stepped on or pinched with the feet and used for walking with the rope as a handle. Based on its movement characteristics, Pat Ni Gajah can be categorized into three fundamental movement types: Locomotor Movements, Non-Locomotor Movements, and Manipulative Movements. This structure supports the view that traditional games can be used to develop basic motor skills and the socio-affective aspects of students. Research by [Aliriad et al. \(2024\)](#) shows that traditional games can enhance motor skills and learning motivation in PJOK, while [Mujriah et al. \(2022\)](#) demonstrate that traditional sports models influence fundamental movement skills and students' social attitudes. Apriyadi et al. (2026) also found that a game-based basic movement learning model can be valid and practical for elementary school physical education. Thus, the development of digital infographics in this research expands the function of traditional games from practical activities to visual content that can aid in movement learning.

Another strength of this prototype is the presence of a digital observation rubric. In PJOK learning, teachers often have to observe many students within a limited time. Without clear indicators, observation can become too general and not sufficiently help students improve their movements. The rubric developed in this study combines aspects of movement and character, namely locomotor movement, non-locomotor movement, manipulative movement, self-confidence, enthusiasm, hard work, and discipline. The rubric scoring uses a 1–5 Likert scale, with categories 1 = very low, 2 = low, 3 = moderate, 4 = high, and 5 = very high. This rubric can be used in a simple digital format, such as a spreadsheet or an online form. Thus, the ICT aspect in this research does not only appear in the infographic format but also in the way teachers document observations and provide feedback.

The integration of character values in digital infographic media also becomes an important part of this development. Character values are not inserted as separate slogans, but are directly linked to movement tasks. Confidence emerges when students dare to try the movements; enthusiasm arises when students actively engage in the game; hard work appears when students repeat movements that have not yet succeeded; while discipline emerges when students follow the rules, movement sequences, turns, and safety instructions. This approach brings character education closer to the students' learning experiences. These findings are in line with [Irmansyah et al. \(2020\)](#), which show that traditional games can develop children's social skills in elementary school learning.

From the perspective of learning media, digital infographics have the advantage of presenting information concisely and visually. The research by [Ristanti and Isdaryanti \(2024\)](#) shows that Canva-based infographic media can be developed and tested for feasibility as a learning medium, while [Ramadhan et al. \(2024\)](#) demonstrate that infographics can help improve concept understanding and student engagement. Although both studies are not within the context of PJOK, the principle that can be drawn is that infographics are effective in organizing complex information into a more easily understandable visual format. In this study, the principle is applied to fundamental movement content, so that information which is usually conveyed through verbal explanations can be transformed into visual steps, icons, movement directions, and observation indicators.

The development of this prototype also has practical relevance for physical education teachers. First, the media can help teachers explain fundamental movement games more concisely before practice. Second, the media can be used as a visual guide for students to understand the equipment, playing space, and movement sequences. Third, the digital observation rubric can help teachers assess movement performance and character values more effectively. Fourth, the use of games based on local wisdom makes PJOK learning not only oriented toward physical skills but also introduces cultural identity to students.

The results of expert validation using Aiken's V reinforce the position of the prototype as a content-valid media. The overall Aiken's V value of 0.79 indicates that the media falls into the valid category. Two aspects received a high validity category, namely the suitability of PJOK material and the integration of character values, each with a value of 0.90. This indicates that the content of the media is in accordance with the needs of PJOK learning and the selected character values. Meanwhile, the aspects of clarity in movement demonstrations, visual design and readability, digital observation rubrics, and the relevance of local wisdom fall into the valid category. This pattern is consistent with content validation research in sport science, where expert judgment and Aiken's V are used to determine whether a developed programme or model has sufficient content validity before implementation (Nurjanah et al., 2023; Suratman et al., 2026; Utami et al., 2024). These findings indicate that the prototype is ready to proceed, but still requires limited revisions before being used in a learning trial. These revisions mainly involve simplifying movement demonstrations, improving visual readability, simplifying the observation rubric, sharpening character values, strengthening the identity of the Pat Ni Gajah game, and adding safety notes.

However, this research still has limitations. The development of the new media has reached the prototype and expert validation stage. This research has not yet tested the effectiveness of the media on the improvement of fundamental movement skills, learning motivation, or student character through classroom experiments. Therefore, the results of this study should be read as an initial contribution to the development of digital PJOK media, not as evidence of learning effectiveness. Subsequent research can conduct limited trials in the classroom, measure the responses of teachers and students, and compare learning with and without the use of digital infographics.

Conclusions

This study developed and validated a digital infographic learning media prototype for fundamental movement learning based on the traditional game Pat Ni Gajah among elementary school students. The prototype includes game identity, learning objectives, equipment and play area, movement demonstrations, a digital observation rubric, and integrated character values. The content mapping showed that Pat Ni Gajah can be organized into three fundamental movement categories: locomotor, non-locomotor, and manipulative movements. The digital observation rubric includes seven aspects: locomotor movement, non-locomotor movement, manipulative movement, self-confidence, enthusiasm, hard work, and discipline. Expert validation showed an overall Aiken's V value of 0.79, indicating that the prototype has adequate content validity. The relevance of PJOK content and character-value integration reached high validity, while movement demonstration clarity, visual design, observation rubric suitability, and local-wisdom relevance were categorized as valid. Therefore, the prototype can proceed to product revision before limited classroom trials. This study is limited to product development and expert validation. Further research should conduct limited trials or effectiveness testing to examine the use of this media in actual elementary school PJOK learning.

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Conflict of interest

The authors declare no conflict of interest.

References

- Abadi, A., & Haris Satria, M. (2022). Pengembangan alat abadi speed blocking sebagai alat bantu latihan menepis penjaga gawang futsal. *Indonesian Journal of Physical Education and Sport Science*, 2(1), 54–61. <https://doi.org/10.52188/ijpess.v2i1.228>
- Adha, N. P., Welis, W., Zulfahri, Z., & Handayani, S. G. (2025). Integration of character values into PJOK learning modules in junior high schools: a literature review. *JPPI (Jurnal Penelitian Pendidikan Indonesia)*, 11(4), 225–232. <https://doi.org/10.29210/020256685>
- Aiken, L. R. (1985). Three Coefficients for Analyzing the Reliability and Validity of Ratings. *Educational and Psychological Measurement*, 45(1), 131–142. <https://doi.org/10.1177/0013164485451012>
- Aliriad, H., Adi, S., Manullang, J. G., Endrawan, I. B., & Satria, M. H. (2023). Improvement of Motor Skills and Motivation to Learn Physical Education Through the Use of Traditional Games. *Physical Education Theory and Methodology*, 7989, 32–40. <https://doi.org/10.17309/tmfv.2024.1.04>
- Aprriyadi, A., Manullang, J. G., Imansyah, F., & Tambunan, G. K. (2026). The Development of a Basic Motion Learning Model for Elementary School Students. *Indonesian Journal of Physical Education and Sport Science*, 6(1), 141–150. <https://doi.org/10.52188/ijpess.v6i1.1952>
- Darmawan, A., Sugiarto, T., Saputra, S. A., Priyohutomo, A., & Mahardikarani, A. S. (2024). Development of Virtual Hologram Audio Visualizer Box Technology to Improve Physical Fitness. *Indonesian Journal of Physical Education and Sport Science*, 4(4), 508–517. <https://doi.org/10.52188/ijpess.v4i4.839>
- Dewi, R., Verawati, I., Pane, B. S., & Nurkadri, N. (2022). Analysis of Instruments for Assessment of Basic Movement Skills PJOK Elementary School. *Kinestetik: Jurnal Ilmiah Pendidikan Jasmani*, 6(2), 250–261. <https://doi.org/10.33369/jk.v6i2.21631>
- Greve, S., Thumel, M., Jastrow, F., Krieger, C., Schwedler, A., & Süßenbach, J. (2022). The use of digital media in primary school PE—student perspectives on product-oriented ways of lesson staging. *Physical Education and Sport Pedagogy*, 27(1), 43–58. <https://doi.org/10.1080/17408989.2020.1849597>
- Hall, E. T., & Gray, S. (2016). Reflecting on reflective practice: a coach's action research narratives. *Qualitative Research in Sport, Exercise and Health*, 8(4), 365–379. <https://doi.org/10.1080/2159676X.2016.1160950>
- Irmansyah, J., Lumintuarso, R., Sugiyanto, F., & Sukoco, P. (2020). Cakrawala Pendidikan ., *Cakrawala Pendidikan*, 39(1), 39–53. <https://doi.org/10.21831/cp.v39i1.28210>
- Jastrow, F., Greve, S., Thumel, M., Diekhoff, H., & Süßenbach, J. (2022). Digital technology in physical education: a systematic review of research from 2009 to 2020. *German Journal of Exercise and Sport Research* 4, October 2021, 504–528. <https://doi.org/10.1007/s12662-022-00848-5>
- Maulana, A. S., Wahyuni, D., & Adiman. (2023). Development of Digital Teaching Materials

- for Basic Volleyball Underhand Passing Techniques at Public Elementary School Sigong. *Indonesian Journal of Physical Education and Sport Science IJPESS*, 3(2), 346–355. <https://doi.org/https://doi.org/10.52188/ijpess.v3i2.1945>
- Mujriah, Siswantoyo, Sukoco, P., Roa, F. O., Susanto, E., & Setiawan, E. (2022). Traditional Sport Model to Improve Fundamental Movement Skills and Social Attitudes of Students During Covid-19. *Physical Education Theory and Methodology*, 7989, 309–315. <https://doi.org/10.17309/tmfv.2022.3.02>
- Nurjanah, S., Istiyono, E., Widiastuti, W., Iqbal, M., & Kamal, S. (2023). The Application of Aiken's V Method for Evaluating the Content Validity of Instruments that Measure the Implementation of Formative Assessments. *Journal of Research and Educational Research Evaluation*, 12(2), 2023–2125. <http://journal.unnes.ac.id/sju/index.php/jere>
- Panadero, E., Jonsson, A., Pinedo, L., & Fernández-Castilla, B. (2023). Effects of Rubrics on Academic Performance, Self-Regulated Learning, and self-Efficacy: a Meta-analytic Review. In *Educational Psychology Review* (Vol. 35, Issue 4). Springer US. <https://doi.org/10.1007/s10648-023-09823-4>
- Ramadhan, I., Thoharudin, M., Wiyono, H., Sabirin, & Suriyanisa. (2024). Enhancing Students' Learning Interest and Conceptual Understanding in Sociology: Using the Analogy Method and Canva Infographic Media. *Al-Ishlah: Jurnal Pendidikan*, 16(2018), 5731–5743. <https://doi.org/10.35445/alishlah.v16i4.6385>
- Ristanti, S., & Isdaryanti, B. (2024). Development of Canva-Based Science Infographic Learning Media to Improve Students' Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, 10(10), 7984–7992. <https://doi.org/10.29303/jppipa.v10i10.9506>
- Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Suratman, Pratama, R. S., Appukutty, M., & Elliana, D. (2026). Content Validation of Badminton Training Program Model for Young Athletes. *Indonesian Journal of Physical Education and Sport Science*, 6(1), 68–78. <https://doi.org/https://doi.org/10.52188/ijpess.v3i1>
- Utami, L., Festiyed, Dian Purnama Ilahi, Arista Ratih, Elvi yenti, & Lazulva. (2024). Analisis Indeks Aiken Untuk Mengetahui Validitas Isi Instrumen Scientific Habbits of Mind. *Journal of Research and Education Chemistry*, 6(1), 59. [https://doi.org/10.25299/jrec.2024.vol6\(1\).17430](https://doi.org/10.25299/jrec.2024.vol6(1).17430)
- Zhou, T., Bubnys, R., Grajauskas, L., Cañabate, D., & Colomer, J. (2025). Modes of self-reflection in physical education instruction. *Frontiers in Education*, 10(July), 1–11. <https://doi.org/10.3389/educ.2025.1645817>

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