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Development of METAGERTA Media based on Smart Apps Creator to Improve Metamorphosis Learning Outcomes in Elementary School

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ABSTRACT

In science learning, especially metamorphosis material at Wonolopo 02 Elementary School, the use of interactive learning media has not been optimally implemented and its development is still limited, so that students experience difficulties in understanding the concepts being studied. This study aims to develop METAGERTA (Metamorphosis through Dance Movement) media based on Smart Apps Creator and to determine its feasibility and effectiveness in improving student learning outcomes on metamorphosis material in elementary schools. This study uses the Research and Development (R&D) method with the ADDIE development model. The research subjects consisted of 28 third-grade students. Data collection techniques were carried out through observation, interviews, questionnaires, and student learning outcome tests. Data were analyzed using quantitative and qualitative approaches. The results of the study show that the development of METAGERTA media based on Smart Apps Creator is equipped with navigation buttons and motion activities, which invite students to learn metamorphosis through motion exploration. METAGERTA media obtained a very feasible category with a value of 94.7% from media experts and material experts. The results of the t-test showed a significant difference between the pretest and posttest scores with a significance of 0.000. In addition, METAGERTA media obtained an N-Gain value on a small scale of 72.1% and a large scale of 71.4%, indicating an increase in student learning outcomes in the high category. Thus, METAGERTA media based on Smart Apps Creator is feasible and effective for use as a learning medium for metamorphosis material in elementary schools.

Keywords: Learning Outcomes, Learning Media, Metamorphosis, Science, Learning, Smart Apps Creator

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INTRODUCTION

Education plays a crucial role in developing and enhancing the quality of human resources by equipping individuals with strong competencies and competitiveness. It serves as a fundamental necessity in the continuous process of human resource development. This educational journey occurs throughout life, starting from the smallest environment such as the family, and then extending to formal institutions like schools as well as the wider community (Puspita & Sumardi, 2023). The quality of education in Indonesia remains relatively low compared to that of other countries on a global scale (Kurniawati, 2022). This condition highlights the importance of continuous efforts to enhance the quality of education, including improving learning processes, developing curricula, and utilizing innovative instructional media. Through high-quality education, individuals can develop their knowledge and skills

while also cultivating moral values that guide their behavior in everyday life (Kristiyawati & Ary, 2024).

Rapid technological advances have also impacted the world of education, particularly in supporting information access and student learning success. The development of digital technology enables students to access extensive, fast, and easily accessible learning resources through various learning platforms (Resti et al., 2024). The integration of technology in education not only transforms the learning process but also plays a significant role in enhancing educational quality to better address future challenges (Safitri, 2024). Advancements in technology motivate teachers to continually enhance the quality of learning by fostering creativity and innovation, particularly through the use of learning media and technological tools to create engaging, effective, and meaningful learning experiences (Sari & Erita, 2024). However, in practice, the use of technology in teaching is still not fully optimized. Teachers' limited ability to innovate through technology-based learning media is one of the factors contributing to students' low level of understanding of the subject matter.

Learning media helps teachers deliver teaching materials at various levels of education more effectively and in an organized manner. The presence of learning media not only facilitates the process of conveying information but also contributes to increasing student learning motivation (Zaki et al., 2025). The use of appropriate learning media can facilitate students' deeper understanding of the material. Beyond functioning as instructional tools, learning media also help stimulate students' thinking, emotions, focus, and skills, thereby supporting more effective learning (Kurniawan & Ary, 2024). In the learning process, the use of media that can enhance students' enthusiasm is essential, as it encourages them to stay motivated and actively ask questions about concepts they do not yet understand (Nurhidayah et al., 2022). In this way, learning becomes more interesting and the learning outcomes obtained can be more optimal.

Based on observations and interviews conducted with teachers and students in Grade III at Wonolopo 02 Public Elementary School, particularly in the Natural and Social Sciences (IPAS) subject, several issues were identified. One of the main problems was students' low level of understanding of metamorphosis. Additionally, the learning media used in the instructional process was still not optimal and had not been fully developed. The media used was limited to YouTube videos without any variety of activities such as educational games that could increase student engagement. Furthermore, teachers still dominated the learning process. This condition caused students to tend to be passive, bored, lack interest, and lack sufficient opportunities to explore and understand the material. Monotonous learning made students easily bored and less motivated to actively participate. Teachers also stated that students needed more interactive, innovative learning that directly involved them in learning activities. Although the school was equipped with projectors and WiFi networks in each classroom, teachers had not fully utilized these facilities in the learning process. Teachers felt they had not yet mastered the use of digital media, such as creating digital materials using applications.

Based on the problems that arise, teachers as facilitators need to innovate in presenting metamorphosis material in an engaging way, for example through learning media developed with Smart App Creator. This application is software designed to produce learning media that can be operated on computers and Android-based devices (Nursalimah & Sutisna, 2024). Smart Apps Creator enables developers to integrate visual elements, videos, animations and music to create meaningful, fun and engaging learning experiences for students (Sulistiawan et al., 2025). In addition, media developed through this application can be published in various formats such as HTML, EXE, and Android applications (Faris et al., 2025). Thus, learning media developed using Smart Apps Creator can provide an innovative and enjoyable metamorphosis learning experience for students. Through Smart Apps Creator, researchers developed a new app called METAGERTA, which stands for Metamorphosis through Dance Movement.

In line with previous research, it was revealed that the development of learning media based on Smart Apps Creator was able to increase students' learning motivation (Dewi et al., 2024; Ardiansyah & Indrakusuma, 2025). Furthermore, other findings also show that the Smart Apps Creator application is able to improve student learning outcomes (Lestari & Hidayati,

2023; Nurhidayah et al., 2022; Wilkimalzis & Zuardi, 2024). However, until now there has been no research that specifically develops METAGERTA media based on Smart Apps Creator on Metamorphosis material.

In response to these conditions, the researchers sought to develop an innovative learning medium in the form of METAGERTA, based on Smart Apps Creator, for teaching metamorphosis material at SD Negeri Wonolopo 02 as an effort to improve the learning outcomes of Grade III students. This study aims to examine the development process of the METAGERTA media, evaluate its feasibility, and assess its effectiveness in enhancing students' learning outcomes on metamorphosis material at Wonolopo 02 Public Elementary School.

METHOD

This research applies the Research and Development (R&D) type of research which is oriented towards developing and testing products to ensure they meet the criteria for feasibility and effectiveness in their use in the learning process (Sugiyono, 2023). The product produced in this research is a METAGERTA (Metamorphosis through Dance Movement) learning media based on Smart Apps Creator which is designed as an interactive learning tool to facilitate students in understanding the concept of metamorphosis in a more interesting, contextual, and meaningful way.

The development model applied in this study refers to the ADDIE model which includes five main stages, namely analysis, design, development, implementation, and evaluation. In the analysis stage, researchers conducted systematic observation and interview activities to identify various problems that occurred in the learning process at Wonolopo 02 Public Elementary School. The findings obtained at this stage were then used as a basis for designing solutions that were realized in the form of developing interactive learning media. The design stage involved preparing media designs, organizing materials, developing research instruments, and developing pretest and posttest questions. In the development stage, the designs were then realized into METAGERTA media using the Smart Apps Creator application, which was then validated by media experts and material experts. After being declared feasible, the media underwent an implementation process in third-grade learning by administering a pretest before use and a posttest after learning. The final stage was evaluation, which aimed to assess the level of feasibility and effectiveness of the media in improving student learning outcomes. All stages were carried out systematically to produce valid, feasible, and effective learning media for use in the learning context.

The research was conducted at Wonolopo 02 Public Elementary School on third-grade students in the 2025/2026 academic year. This school was chosen as the research location due to its relevance to the topic and issues being studied and its ease of access for researchers in collecting the necessary data. The research subjects were 28 students, who were then divided into two trial stages: 8 students in a small-scale trial and 20 students in a large-scale trial. In addition, this study also involved expert validators including science and science material experts, dance material experts, and media experts.

Data collection techniques in this study used test and non-test techniques. Test techniques were used to measure the improvement of student learning outcomes in the metamorphosis material through pretests and posttests consisting of 20 multiple-choice questions. Meanwhile, non-test techniques included observation, interviews, questionnaires, and documentation. Observations were conducted on January 9, 2026, to identify phenomena related to the research focus. Interviews were conducted with the third-grade teacher, Mrs. Anabela Dara Puspita, S.Pd., at Wonolopo 02 Public Elementary School to obtain information regarding learning conditions and learning media needs. Furthermore, questionnaires used to obtain research data included a needs questionnaire, a feasibility questionnaire, and a response questionnaire. Documentation was used as a data complement, focusing on photos of learning activities and other documents supporting the implementation of the research.

Data analysis in this study was carried out using a combination of qualitative and quantitative approaches. The qualitative analysis was employed to describe findings from observations, interviews, and expert feedback, which served as a basis for refining the

developed media. Meanwhile, the quantitative analysis was used to process data obtained from expert validation questionnaires using a Likert scale to determine the feasibility of the METAGERTA media.

Table 1. Learning Media Feasibility Criteria

Percentace (%)	Categori
81% - 100%	Very Feasibility
61% - 80%	Feasibility
41% - 60%	Fairly Feasibility
21% - 40%	Not Feasibility
0% - 20%	Very Tidak Feasibility

After going through a validation process by experts, the researcher conducted revisions by referring to the suggestions and input provided by the validators. This revision aimed to improve and refine various aspects, including material content, media display, language, and navigation systems to make the media more appropriate and easy to use. The revised media was subsequently applied in the learning process by administering a pretest prior to its use and a posttest afterward. The collected data on students' learning outcomes were then analyzed using normality tests, t-tests, and N-Gain calculations to measure the extent of improvement following the implementation of the learning media.

Tabel 2. N-Gain Criteria

Persentase (%)	Kategori
n-gain > 70	High
30 ≤ n-gain ≤70	Medium
n-gain < 30	Low

RESULT AND DISCUSSION

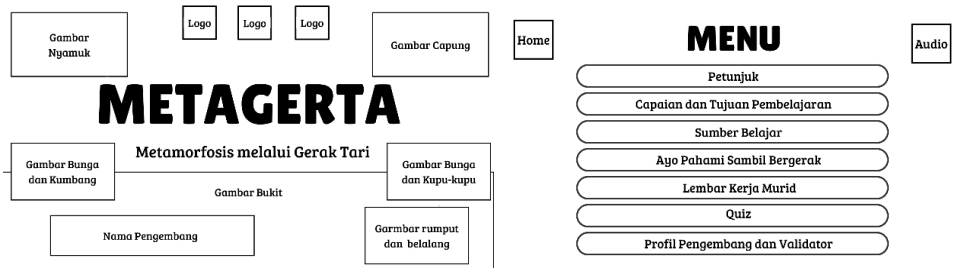
The product produced in this study is an interactive learning media METAGERTA (Metamorphosis through Dance Movement). This media was created using the Smart Apps Creator application so it can be operated on both computers and Android devices. This study applies the Research and Development method with the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation. This development model is used as a guideline in the media development process, starting from the needs analysis stage to product evaluation.

The first stage is analysis. Researchers conducted the analysis stage through observation activities, distributing needs questionnaires, and interviews with third-grade homeroom teachers at Wonolopo 02 Public Elementary School. The results of these activities showed several potentials that support the research, such as the availability of school facilities in the form of WiFi and projectors in each class. However, several problems were also found in the learning process, including students still having difficulty understanding the metamorphosis material, the use of limited and less interactive learning media, passive learning and the lack of activities that can make students explore the material. These conditions have an impact on low student learning outcomes, especially on the science material about metamorphosis. Based on the data obtained, it is important to develop learning media that increase student interest in learning so that it has implications for improving learning outcomes.

The second stage is design. Researchers designed the METAGERTA media, which will be developed in a structured and systematic manner. The design process begins with establishing learning objectives that refer to the learning outcomes of Natural and Social Sciences (IPAS). Furthermore, researchers designed the flow of material presentation, display design, and navigation systems, such as buttons, to ensure the media is easy to operate and engaging for students. The designed learning media has several menus: instructions, learning outcomes and objectives, learning resources, "let's understand while moving" activities, worksheets, quizzes,

and developer and validator profiles. Researchers also prepared assessment instruments in the form of test questions to measure learning outcomes, response questionnaires, and expert validation sheets, which were used as guidelines in assessing the media's feasibility during the development stage.

Figure 1. METAGERTA Media Design Display



In the "Let's Understand While Moving" activity, narrative stories explaining the stages of complete and incomplete metamorphosis are presented. This activity features seven systematically designed stories, with details of the story designs in Table 3.

Table 3. Narrative Design

No.	Story Title	Stages of Metamorphosis	Floor Pattern
1	The Beautiful Journey of the Butterfly	Egg-Caterpillar-Chrysalis-Butterfly	4
2	The Life of a Mosquito in a Puddle	Egg-Larva-Chrysalis-Mosquito	4
3	From Egg to Amazing Frog	Egg-Tadpole-Tadpole with Frog Legs-Frog	5
4	Transformed into a Beetle	Egg-Larva-Chrysalis-Beetle	4
5	The Cockroach and Its Miraculous Transformation	Egg-Nymph- Cockroach	4
6	Dragonfly in the Beautiful Rice Field	Egg-Nymph-Dragonfly	4
7	The Adventures of the Little Grasshopper	Egg-Nymph- Grasshopper	4

The third stage is development. In this stage, researchers implemented the media design developed in the previous stage. The developed media includes illustrative images, audio, learning resources, narrative stories about the stages of metamorphosis, student worksheets, quizzes, and profiles of the developers and validators. The following image shows the METAGERTA media product developed using Smart Apps Creator.

Figure 2. METAGERTA Media Results Based on Smart Apps Creator (a) Cover and (b) Menu

(A) **(B)**

Figure 3. METAGERTA Media Results Based on Smart Apps Creator (c) Learning Resources and (d) Let's Understand While Moving

(C) **(D)**

After the METAGERTA media was successfully developed using Smart Apps Creator, a validation process was conducted by subject matter and media experts to assess its suitability. This validation process used a questionnaire containing several assessment aspects on a Likert scale. The validation results served as a basis for researchers to revise and refine the media, taking into account the suggestions and input provided by the experts.

Table 4. Material and Media Validation Score Results

No.	Validator	Result	Criteria
1	Science Subject Matter Expert	95%	Very Feasible
2	Dance Subject Matter Expert	92,3%	Very Feasible
3	Media Expert	96,9%	Very Feasible
	Overall Average Results	94,7%	Very Feasible

Based on expert validation results, the METAGERTA media developed through the Smart Apps Creator application was declared "very feasible." This was demonstrated by the assessment percentages from the science and science subject matter experts at 95%, the dance subject matter experts at 92.3%, and the media experts at 96.9%. Overall, the average score reached 94.7%, which falls within the "very feasible" criteria. However, several suggestions for improvement were made by the experts. The revisions from the subject matter experts included adjusting the use of terminology, adding a "Student Worksheet" menu, and navigating the media. Meanwhile, the media experts suggested adjusting the font color for a more engaging experience and adding metamorphosis images to the "Let's Understand While Moving" activity.

The fourth stage was implementation. In this stage, the revised METAGERTA media was implemented in learning activities in grade III of Wonolopo 02 Elementary School. Prior to the lesson, students were given a pretest to assess their initial understanding of the metamorphosis material. Furthermore, the learning process is carried out using METAGERTA media based on Smart Apps Creator, where students participate in learning activities that include understanding the material, "Let's Understand While Moving" activities, completing worksheets, and interactive quizzes available on the media. After the entire learning series is completed, students are given a posttest to identify changes and improvements in learning outcomes after using the learning media.

Table 5. Normality Test Results

Result	Class	Shapiro-Wilk		
		Statistic	Df	Sig.
	Pretest A (Small Scale)	.958	8	.855
	Posttest A (Small Scale)	.963	8	.840
	Pretest B (Large Scale)	.914	20	.077
	Posttest B (Large Scale)	.912	20	.070

In Class A, the normality test indicated that the significance values were 0.855 for the small-scale pretest and 0.840 for the small-scale posttest. Since data are regarded as normally distributed when the significance value is sig. > 0.05. Based on these criteria, the values 0.855 > 0.05 and 0.840 > 0.05 confirm that the small-scale data in Class A follow a normal distribution.

In class B, the normality test revealed significance values of 0.077 for the large-scale pretest and 0.070 for the large-scale posttest. As these values is sig. > 0.05, it can be concluded that the large-scale data in Class B are normally distributed.

Tabel 6. Small Scale T-Test Result

Action	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pretest - Posttest	-6.875	16.243	5.743	-50.455	-23.295	-6.421	7	.000

According to the testing criteria, when the Sig. (2-tailed) value is < 0.05, it indicates a difference between the pretest and posttest results. The t-test conducted on the small-scale trial produced a Sig. (2-tailed) value of 0.000, suggesting a statistically significant difference between the pretest and posttest scores. These findings indicate an improvement in students' learning outcomes after the implementation of the METAGERTA media..

Tabel 7. Large Scale T-Test Result

Action	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pretest - Posttest	-32.750	9.525	2.130	-37.208	-28.292	-15.377	19	.000

According to the testing criteria, when the Sig. (2-tailed) value is < 0.05, it indicates a difference between the pretest and posttest results. The t-test conducted on the large-scale trial produced a Sig. (2-tailed) value of 0.000, suggesting a statistically significant difference between the pretest and posttest scores. These findings indicate an improvement in students' learning outcomes after the implementation of the METAGERTA media.

Table 8. Results of the Small-Scale N-Gain Test

Action	N	Minimum	Maximum	Mean	Std. Deviation	Category
N-Gain	8	.50	1.00	.7212	.17031	High
Presentase N-Gain	8	50.00	100.00	72.1%	17.03147	

Based on Table 8, the average N-Gain value was 0.7212, with a percentage of 72.1%. The value obtained in the small-scale test falls into the "high" category. Thus inferred utilization METAGERTA media extremely effective elevating learner study results in the small-scale test.

Table 9. Results of the Large-Scale N-Gain Test

Action	N	Minimum	Maximum	Mean	Std. Deviation	Category
N-Gain	20	.50	1.00	.7147	.15570	Tinggi
Presentase N-Gain	20	50.00	100.00	71.4%	15.57028	

Based on Table 9, the average N-Gain value was 0.7147, with a percentage of 71.4%. The value obtained in the large-scale test falls into the "high" category. Therefore, inferred utilization METAGERTA media extremely effective elevating learner study results the large-scale test.

The final stage is evaluation. At this stage, the researcher assessed the results of the METAGERTA media implementation. The evaluation process was carried out by collecting teacher and student questionnaire responses regarding the use of the media. The questionnaire contained several assessment aspects, including user friendliness, material clarity, attractiveness of the display, and the usefulness of the media in learning. The results of the teacher and student questionnaire responses were then analyzed to determine the level of practicality and user response to the developed media.

Table 10. Teacher and Student Responses

Respondent	Result Percentage (%)	Category
Teacher	97,3%	Very Practical
Students	91%	Very Practical

Based on Table 10, the teacher response results show a percentage of 97.3% and student responses obtained 91%, with the category "very practical". These findings indicate that METAGERTA media is easy to use, has an attractive appearance, and helps students in the learning process. Therefore, these results serve as material for reflection for researchers to maintain and improve METAGERTA media to be more effective and appropriate to learning needs.

DISSCUSSION

To date, the development of Smart Apps Creator-based learning media has been widely implemented in various elementary school subjects, both in science and non-science domains. Several previous studies have shown that this media has a significant impact and is highly suitable and effective for use in learning, improving student learning outcomes (Utami & Ary, 2024; Safitri et al., 2024; Sektiyana et al., 2025). This study presents a notable novelty compared to previous research on Smart Apps Creator-based learning media. Earlier studies generally employed Smart Apps Creator to present text-based content, images, animations, interactive quizzes, or Augmented Reality features that primarily emphasized visual and digital aspects. However, there is limited evidence of studies that integrate dance movement elements as a conceptual representation of metamorphosis stages. In this regard, the METAGERTA learning media based on Smart Apps Creator introduced in this study represents an innovative development that has not been extensively explored in prior research.

The uniqueness of METAGERTA learning media lies not only in the selection of materials, but also in the interactive learning design that integrates multimedia elements thoroughly. The final result of METAGERTA learning media is an application that can be downloaded using Android, laptops, and computers. This media is equipped with visualizations of the 10 stages of metamorphosis, presented in the form of attractive images, making it easy for elementary school children to understand. To strengthen student understanding and engagement, this media is also equipped with structured movement activities, so that students not only observe the material visually, but also directly experience each stage of metamorphosis (Liu et al., 2025). These findings have strong relevance for the development of learning, particularly in the fields of elementary education and science learning, because they show that interactive media that combine digital technology with physical activity can increase the understanding of concepts in greater depth (Haq et al., 2024). The use of this media has been proven to be able to increase conceptual understanding and student involvement through interactive features and interesting visualizations (Ginting, 2022). In addition, Smart Apps Creator-based media also contributes to developing critical thinking skills and supports more student-centered learning (Istiqomah et al., 2025). In fact, in various subject contexts, this media is stated to be very suitable, practical, and effective in improving

learning outcomes compared to conventional methods (Armilah et al., 2024). Thus, this research provides an important contribution as an alternative design for innovative learning media that can be adapted by educators to create more meaningful and contextual learning experiences.

The development of METAGERTA (Metamorphosis through Dance Movement) learning media based on Smart Apps Creator integrates science and art concepts in the learning of metamorphosis material in elementary schools. The METAGERTA concept is designed to combine digital visualization with kinesthetic activities, so that students not only understand the concept cognitively, but also experience the metamorphosis process through body movements as a form of meaningful learning (Ramadhani et al., 2024). METAGERTA (Metamorphosis through Dance Movement) media was developed as an innovation in interactive learning media, aimed at facilitating students' understanding of the concept of metamorphosis in a more effective and engaging manner (Chen et al., 2025). This media development utilizes the Smart Apps Creator application, integrating visual, audio, and interactive presentations into a single application. Presenting material through METAGERTA allows students to be more active in the learning process, as they not only passively receive information but also interact directly with the media through various menus and features (Afkar, 2024).

METAGERTA media is equipped with various navigation buttons to facilitate student operation, such as a start button, a main menu button, a return to the previous page, and a go-to-the-next-page button. This media presents a visualization of the ten stages of metamorphosis, presented in engaging images, making it easier for elementary school students to understand the material (Apipah et al., 2025). Furthermore, to strengthen student understanding and engagement, the media also features structured movement activities, allowing students not only to visually observe the material but also to directly experience each stage of metamorphosis (Khofifaf et al., 2024). The initial display of the METAGERTA learning media contains a "Menu" that facilitates user navigation. The menu includes several important components, namely Instructions, which provide guidance on using the application; Learning Achievements and Objectives, which contain learning targets that have been aligned with learning outcomes; Learning Resources, which present material on metamorphosis; and Let's Understand While Moving, which contains narrative stories of the stages of metamorphosis; and Quiz, which contains ten multiple-choice questions. This research is in line with previous findings that show that digital media that integrates visual and kinesthetic elements in one application can provide a more meaningful learning experience (Bumantara et al., 2026).

Based on the validation results conducted by experts, the METAGERTA media was declared in the "very feasible" category for implementation in learning activities. The assessment from the science and science material expert obtained a score of 95%, the dance material expert 92.3%, and the media expert 96.9%. Overall, the average score obtained reached 94.7%, with the criteria of very feasible. The material presented in the media is in accordance with the learning objectives and characteristics of students, but still needs adjustments in the use of terms to be more appropriate and easier to understand. In addition, the selection of colors and text display in the media should be made more attractive and contrasting to be able to increase student attention. This achievement indicates that the developed media has met the aspects of material suitability, systematic presentation, and good quality media display design. The validation stage is a crucial step to ensure that the product produced is in accordance with learning needs and has an adequate level of feasibility and quality (Mahmuzah et al., 2024). The results of this study are consistent with previous research indicating that learning media developed using Smart Apps Creator demonstrates a high level of validity based on expert evaluations, thereby making it feasible for implementation in the learning process (Utami & Ary, 2024; Nissa & Putera, 2024; Fitri & Helsa, 2024). In addition to other research that shows that learning media developed using Smart Apps Creator shows a high level of validity but a different development method, namely the Borg & Gall model (Subekti et al., 2021; Ghani & Maslikhah, 2023; Magfiroh et al., 2025)

Not only in terms of feasibility, METAGERTA media has demonstrated effectiveness in improving student learning outcomes. This is demonstrated by the significant difference

between learning outcomes before and after using the developed media (Dakhlan & Ary, 2025). In small-scale trials, the average N-Gain was 0.7212 with a percentage of 72.1%, which is included in the "high" category. Meanwhile, in large-scale trials, the average N-Gain value reached 0.7147 with a percentage of 71.4%, which is included in the "high" category. This level of effectiveness is inseparable from the presentation of material that integrates multimedia elements in one learning medium. The use of application-based interactive media provides a more engaging learning experience because students can interact directly with the learning material presented (Hasnawiah & Maslena, 2024). The findings of this study are consistent with prior research, which indicates that the use of digital learning applications developed with Smart Apps Creator can significantly enhance students learning outcomes, as the material is delivered in a more varied and easily comprehensible way (Fitri & Helsa, 2024; Nuryandis et al., 2024; Reza & Putra, 2025). In addition, other findings also show that learning media developed using Smart Apps Creator has proven to be effective in learning even for different subjects and populations (Aeni et al., 2023; Fauziah & Muhammadi, 2025; Mauliana & Masniladevi, 2026).

In addition to demonstrating its effectiveness, METAGERTA media also has a very good level of practicality based on teacher and student responses to its use in learning. The results of teacher assessments reached a percentage of 97.3% and student responses were 91%, both of which are included in the "very practical" category. These findings indicate that METAGERTA media based on Smart Apps Creator is considered easy to use and supports optimal learning implementation. This level of practicality is supported by the media's flexibility that can be operated through various devices, both Android and computers, making it easy for teachers and students to access it anytime and anywhere (Wahyuto Sejati & Hardi, 2023; Syadida, 2022; Alwi et al., 2025). The results of this study are also in line with the findings of other studies which show that Smart Apps Creator-based learning media has a high level of practicality and appeal, applied even at different educational levels (Tristanti & Iffah, 2022; Akbar et al., 2023; Firdaus & Gafari, 2023)

This research provides a significant theoretical contribution to the development of science learning theory, particularly in metamorphosis material in elementary schools. Theoretically, the results of this study indicate that the use of interactive and innovative learning media can improve student learning outcomes. METAGERTA media can encourage active learning and help students build understanding through direct experience. This is in line with the constructivism theory proposed by Jean Piaget, which emphasizes that knowledge is actively constructed through interaction and learning experiences (Bustomi et al., 2024). In addition, this research is also strengthened by the experiential learning principles developed by Kolb and Plovnick which emphasize the importance of direct involvement in the learning process to produce a deeper understanding (Wibowo et al., 2024). In this context, METAGERTA media facilitates students to construct their own understanding through kinesthetic activities and direct exploration of the material. METAGERTA media is not only able to attract attention, but also encourages students' activeness in the learning process, so that they are directly involved in understanding the concept of metamorphosis. Through the integration of dance movement elements and digital visualization, students gain a more concrete learning experience, so that the process of knowledge formation becomes more meaningful and not just rote. Thus, this study further strengthens the theoretical basis that interactive learning media that combine aspects of direct experience, physical activity, and digital technology have an important contribution in improving learning outcomes and the quality of science learning, especially in helping students understand abstract concepts in a more concrete and understandable way.

The findings of this study offer practical implications that METAGERTA learning media based on Smart Apps Creator can serve as an innovative, interactive, and user-friendly alternative for elementary school instruction, particularly in teaching metamorphosis. This media assists teachers in delivering more engaging and varied lessons while promoting their role as active facilitators of learning. For students, the integration of digital visualization with movement-based activities provides a more concrete and meaningful learning experience, thereby enhancing conceptual understanding, engagement, and motivation. Furthermore, for schools, the implementation of this media supports the effective use of technology in learning

and can serve as a reference for developing similar media that integrate science, art, and kinesthetic elements across other subject materials.

The primary strength of this study is the development of METAGERTA media, which combines science and art concepts within a single interactive learning tool based on Smart Apps Creator. This integration offers a learning approach that goes beyond cognitive achievement by also promoting student engagement in exploratory activities and fostering creativity (Syarifuddin et al., 2025). Different from learning media in general, METAGERTA media combines digital visualization with dance movement activities so that students can directly understand each stage of metamorphosis through body movements (Wardoyo & Utanto, 2025). METAGERTA media provides a space for students to express their understanding of concepts through the creation of movements at each stage of metamorphosis, using various floor plans and movement levels. Furthermore, this media makes learning not only informative but also encourages active engagement, exploration, and participation.

This study has several limitations. It focused solely on metamorphosis material in third-grade science lessons, so its effectiveness across different materials or grade levels cannot be fully determined. The use of this media also requires the support of digital devices, so its implementation depends on the availability of technological facilities in schools. Therefore, further research is expected to examine the use of this media in a wider range of schools and with a wider variety of learning materials.

CONCLUSION

Based on data analysis from various tables, it can be concluded that the use of the METAGERTA (Metamorphosis through Dance Movement) media based on Smart Apps Creator is an innovative learning media that integrates science and art concepts through a combination of digital visualization with kinesthetic activities. Through this media, students not only understand the concept cognitively, but also directly understand the process of metamorphosis through body movements. The development of METAGERTA media based on Smart Apps Creator with the ADDIE model is declared to meet the criteria of being feasible, effective, and practical. The validation results show that the media obtained a very feasible category with a percentage of 94.7%. Futhermore, the t-test results showed a significant difference between the pretest and posttest scores with a significance value of 0.000. The N-Gain calculation on a small scale of 72.1% and a large scale of 71.4% indicates an increase in student learning outcomes in the high category. In addition, the teacher response of 97.3% and students of 91% indicates that the media is in the very practical category. Thus, METAGERTA media is feasible, effective, and has the potential to become an alternative innovation in interactive learning media that can improve learning outcomes as well as student involvement in the learning process.

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