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Development of KOMETA (Metamorphosis Comic) Media in the Science and Social Studies (IPAS) Subject for Grade III Students at SDN Kamal 2 Bangkalan

Ihda Amalia[1*], Ade Cyntia Pritasari[2]

Elementary School Teacher Education Study Program, Faculty of Teacher Training and Education, Trunodjoyo University, Madura

Email:

ihda2603@gmailcom; ade.cyntiapritasari@trunojoyo.com

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Comic Media, Metamorphosis, Environmental Sustainability

Abstract: This study was a research and development project that produced KOMETA (Metamorphosis Comic) media integrated with environmental sustainability in the Science and Social Studies (IPAS) subject on metamorphosis material for third-grade students at SDN Kamal2 Bangkalan. This research was motivated by the limited availability of learning media capable of providing concrete visualization, causing students to experience difficulties in understanding metamorphosis material and resulting in low learning outcomes. The objective of this study was to determine the validity, effectiveness, and attractiveness of the developed KOMETA media. This study employed the Research and Development (R&D) method using the ADDIE model, which consists of the analysis, design, development, implementation, and evaluation stages. The research subjects were third-grade students of class III-B at SDN Kamal2 Bangkalan through limited and large-scale trials. The results showed that KOMETA media was highly valid based on expert validation, with scores of 95% from material experts, 92% from learning media experts, 90% from instructional design experts, and 98% from language experts. KOMETA media was also effective, with classical learning mastery of 85%, teacher activity of 95%, and student activity of 94.5%. In addition, KOMETA media was categorized as highly attractive, with teacher response percentages of 95% and student responses of 98.6%. Based on these findings, KOMETA media is feasible to be used as a learning medium for the IPAS subject on metamorphosis material in third grade elementary school.

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INTRODUCTION

Learning in elementary schools needs to be adjusted to the cognitive development stage of students, who are still at the concrete operational stage. At this stage, students can more easily understand concepts when learning is presented through visual media, pictures, and engaging stories. Learning media play an important role in helping students understand the material, increasing learning motivation, and creating an active and enjoyable learning atmosphere.

Science and Social Studies (IPAS) learning in elementary schools aims to develop students' abilities to understand natural and social phenomena contextually. However, in its implementation, obstacles are still found in the form of limited learning media used by teachers. Based on observations and interviews conducted in class III-B at SDN Kamal

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2 Bangkalan, it was found that teachers still relied on textbooks as the primary learning media, and the learning process tended to be dominated by the lecture method. This condition caused students to be less active and easily bored.

Metamorphosis material is one of the IPAS topics that requires concrete media because it discusses changes in the form of living things through certain stages. Students often experience difficulties in distinguishing complete metamorphosis from incomplete metamorphosis, as well as in classifying animals based on their types of metamorphosis. These conditions have an impact on learning outcomes, which remain relatively low.

One alternative learning medium that is suitable for the characteristics of elementary school students is comic media. Comics are able to present material through pictures and engaging storylines, thereby helping students understand concepts systematically. In addition, IPAS learning can also be integrated with environmental sustainability values so that students develop awareness and caring attitudes toward the environment from an early age.

Based on these problems, the researcher developed KOMETA (Metamorphosis Comic) media integrated with environmental sustainability for IPAS learning in Grade III. The purpose of this study was to determine the validity, effectiveness, and attractiveness of the developed KOMETA media.

METHODOLOGY

This study employed the Research and Development (R&D) method using the ADDIE model, which consists of five stages: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. The research was conducted at SDN Kamal 2 Bangkalan involving Grade III-B students.

The research subjects consisted of expert validators and trial participants. The expert validators included material experts, learning media experts, instructional design experts, and language experts. The target trial subjects were Grade III-B students who participated in both limited-scale and large-scale trials.

Data were collected through interviews, observations, questionnaires, and learning outcome evaluation tests. The research instruments included expert validation sheets, observation sheets for teacher and student activities, teacher and student response questionnaires, and evaluation test items. Data analysis techniques employed descriptive quantitative analysis using percentage calculations to determine the categories of validity, effectiveness, and attractiveness of the media.

RESEARCH FINDINGS

The research findings on the development of KOMETA (Metamorphosis Comic) media integrated with environmental sustainability were obtained through expert validation, limited-scale trials, and large-scale trials. The data collected included validity, effectiveness, and attractiveness of the KOMETA media.

1. Validity Results of KOMETA Media

The validity test of KOMETA media was conducted through assessments by four validators, namely material experts, learning media experts, instructional design experts, and language experts. This validation aimed to determine the feasibility of the media before its implementation for students. The validation process was carried out from September 23, 2025, to October 17, 2025.

a. Material Expert Validation

Material expert validation was conducted to assess the suitability of the metamorphosis content in KOMETA media with the learning outcomes (CP), learning objectives (TP), and the appropriateness of the content with correct scientific concepts. The results of the material expert validation showed that KOMETA media obtained a total score of 38 out of a maximum score of 40, with a percentage of 95%. This percentage was categorized as highly valid.

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This assessment indicates that the material in KOMETA media fulfilled the aspects of material completeness, conformity with metamorphosis concepts, contextual presentation of the material, and the ability of the media to encourage students' curiosity and active participation.

b. Learning Media Expert Validation

Validation by learning media experts was conducted to assess the appearance of KOMETA media in terms of visual design, readability, suitability of illustrations, and effectiveness of the media as a learning aid. The results showed a total score of 37 out of a maximum score of 40, with a percentage of 92%. This percentage was categorized as highly valid.

These results indicate that KOMETA media has a good visual design, illustrations appropriate to metamorphosis material, and the ability to create an enjoyable learning atmosphere.

c. Instructional Design Expert Validation

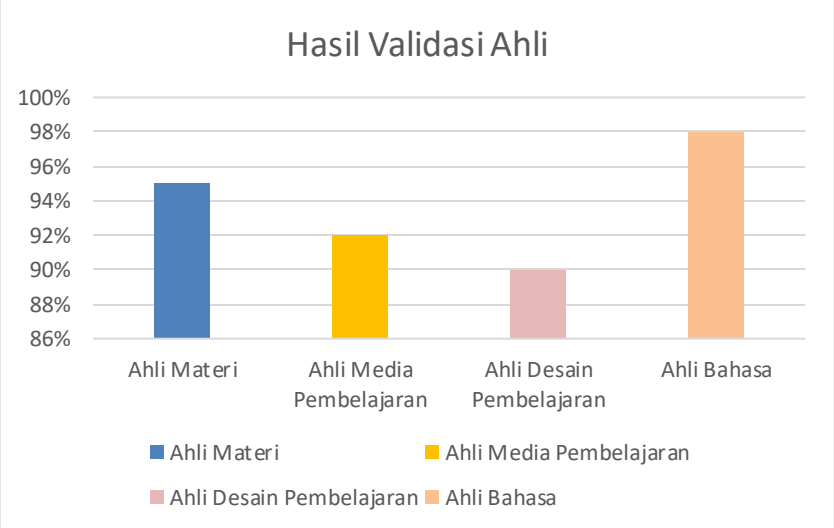
Validation by instructional design experts was conducted to assess the feasibility of the teaching module accompanying KOMETA media, as well as the suitability of the learning steps with the learning objectives. The results showed a total score of 47 out of a maximum score of 52, with a percentage of 90%. This percentage was categorized as highly valid.

This indicates that KOMETA media has a systematic, well-structured, and student-centered instructional design.

d. Language Expert Validation

Validation by language experts was conducted to assess readability, vocabulary use, sentence structure, and the suitability of the language in KOMETA media with the characteristics of third-grade elementary school students. The results showed a total score of 39 out of a maximum score of 40, with a percentage of 98%, which was categorized as highly valid.

These results indicate that the language used in KOMETA media is communicative, simple, suitable for students' daily conversations, and does not create ambiguous meanings.



Source: Researcher's data based on expert validation results.

Based on the recapitulation, it can be concluded that KOMETA media meets the feasibility criteria and can be used in the Science and Social Studies (IPAS) learning process for Grade III students.

2. Effectiveness Results of KOMETA Media

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The effectiveness of KOMETA media was analyzed through students' evaluation test results, observations of teacher activities, and observations of student activities during the learning process. The effectiveness data were obtained during the large-scale trial conducted with 20 students of Grade III-B at SDN Kamal 2 Bangkalan.

a. Students' Evaluation Test Results

The evaluation test was administered after the learning process using KOMETA media. The test consisted of 10 questions designed to measure students' understanding of metamorphosis material. Students were considered to have achieved mastery if their score reached the Minimum Learning Achievement Criteria (KKTP), which was 70.

The results showed that out of 20 students, 17 students achieved mastery scores, while 3 students had not yet reached the KKTP standard.

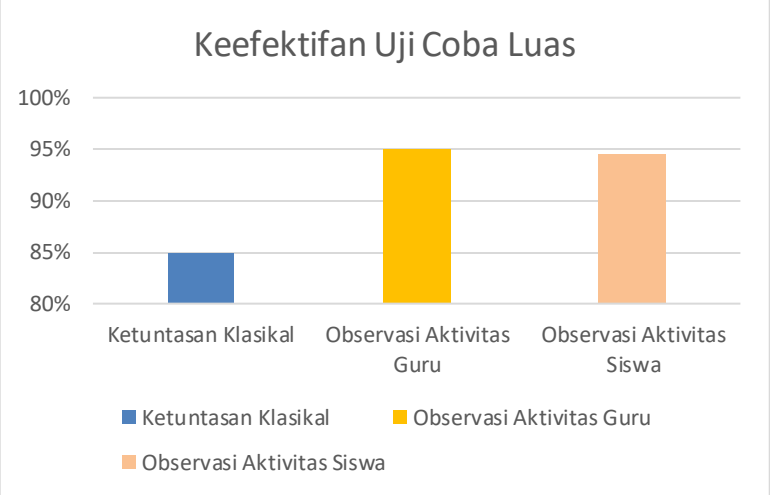
b. Observation Results of Teacher Activities

Observation of teacher activities was conducted to assess the implementation of learning using KOMETA media. The observations were carried out in two meetings during the large-scale trial. The results showed that the teacher obtained a score of 9 in the first meeting and a score of 10 in the second meeting, with a maximum score of 10. The average percentage of teacher activity observation was 95%, which was categorized as effective.

c. Observation Results of Student Activities

Observation of student activities was conducted to assess students' involvement during the learning process using KOMETA media. The results showed that the percentage of student activity in the first meeting was 92%, while in the second meeting it was 97%. The combined average percentage of student activities was 94.5%, which was categorized as effective.

The high level of student activity indicates that KOMETA media was able to increase students' attention, motivation, and participation during the learning process.



Source: Researcher's data from the large-scale trial.

Based on the table, it can be concluded that KOMETA media is effective for use in Science and Social Studies (IPAS) learning on metamorphosis material.

3. Attractiveness Results of KOMETA Media

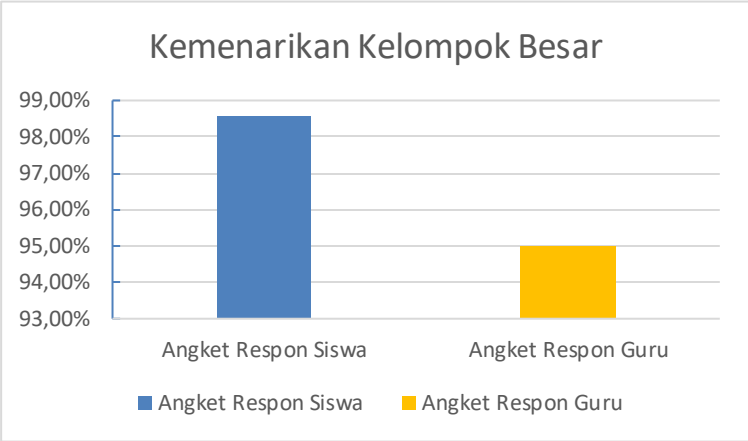
The attractiveness of KOMETA media was measured using teacher response questionnaires and student response questionnaires. The questionnaires were administered after the completion of learning activities using KOMETA

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media. The purpose of these questionnaires was to determine the extent to which KOMETA media attracted attention and provided an enjoyable learning experience.

The teacher response results showed a percentage of 95%, while the student response results showed a percentage of 98.6%. These percentages were categorized as highly attractive.

The high teacher response indicates that KOMETA media was considered helpful in explaining metamorphosis material, facilitating classroom management, and making learning more effective. Meanwhile, the very high student response indicates that KOMETA media was able to attract students' interest in learning through illustrated images, simple storylines, and appealing colors.



Source: Researcher's data from the large-scale trial.

Based on these results, it can be concluded that the attractiveness of the media, according to students, is included in the "Highly Attractive" category.

DISCUSSION

The discussion in this study focuses on three main aspects, namely the validity, effectiveness, and attractiveness of KOMETA media. This discussion explains how the research findings address the objectives of media development and their relevance to the conditions of Science and Social Studies (IPAS) learning in elementary schools.

1. Validity of KOMETA Media

The expert validation results indicated that KOMETA media was categorized as highly valid, with validation percentages of 95% from material experts, 92% from learning media experts, 90% from instructional design experts, and 98% from language experts.

The material expert validation showed that the metamorphosis content presented was aligned with the Learning Outcomes (CP) and Learning Objectives (TP), and that the concept of metamorphosis was accurately presented. This is very important because IPAS material, particularly metamorphosis, requires conceptual accuracy so that students do not experience misconceptions. The contextual presentation of the material also makes it easier for students to relate the content to everyday life, for example through animals commonly found in their home and school environments.

The learning media expert validation showed that the comic had a good visual appearance, clear images, and illustrations appropriate to the material being studied. Comic media are considered visual media that can increase students' attention because they present an attractive combination of pictures and text. KOMETA media was also considered reusable, time-efficient, and capable of creating enjoyable learning experiences. This proves that comic

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media are highly relevant for elementary school learning, where engaging media are needed so that students do not become easily bored.

The instructional design expert validation confirmed that the teaching module accompanying KOMETA media was appropriate, systematic, student-centered, and supportive of student interaction with learning resources. Student-centered learning is one of the main characteristics of learning in the Merdeka Curriculum. Therefore, KOMETA media can support the implementation of active learning in accordance with curriculum demands.

In addition, the language expert validation showed the highest percentage, namely 98%. This proves that the language used in KOMETA media was appropriate to the language abilities of Grade III students. Communicative and simple language makes it easier for students to understand the story content and learning material. Language that matches children's developmental level also prevents difficulties in understanding terms or overly complex long sentences.

Thus, the expert validation results strengthen the conclusion that KOMETA media is feasible for use as an IPAS learning medium, as it fulfills the aspects of content, media design, instructional design, and language use.

2. Effectiveness of KOMETA Media

The effectiveness of KOMETA media was demonstrated through classical learning mastery of 85%, teacher activity of 95%, and student activity of 94.5%.

Classical learning mastery of 85% indicates that most students successfully achieved the predetermined Minimum Learning Achievement Criteria (KKTP). This shows that KOMETA media was able to improve students' understanding of metamorphosis material. One reason for the improvement in learning outcomes is that the comic presents the metamorphosis process in sequential images, allowing students to clearly observe the stages of changes in living organisms. This helps students distinguish between complete and incomplete metamorphosis.

In addition to learning outcomes, teacher activity was also categorized as effective. Teacher activity reaching 95% indicates that KOMETA media helped teachers implement learning in a structured manner. Teachers found it easier to explain the material because KOMETA media had already presented the content in story form, enabling teachers to guide students to read, observe images, and discuss the comic content. This reduced the dominance of lecture methods and increased the variety of learning activities.

High student activity (94.5%) indicates that KOMETA media was able to increase student involvement in the learning process. Students became more active in asking questions, discussing, and showing curiosity about metamorphosis material. Visual media such as comics are able to attract students' attention and make them more focused compared to learning using textbooks only. This also shows that KOMETA media was able to create an enjoyable and conducive learning atmosphere.

Thus, KOMETA media was not only effective in improving student learning outcomes, but also effective in increasing learning activities from both teacher and student perspectives.

3. Attractiveness of KOMETA Media

The attractiveness of KOMETA media, based on teacher responses, reached 95%, while student responses reached 98.6%, both categorized as highly attractive.

The high student response indicates that KOMETA media was highly favored because it featured attractive illustrations, bright colors, story characters close to students' daily lives, and storylines that were easy to understand. Comic media indeed have the advantage of making learning feel like reading a story rather than formal studying. This makes students feel more comfortable and less pressured.

In addition, the high teacher response indicates that KOMETA media was considered helpful in the learning process. Teachers felt that this media could increase student motivation and help students understand the material more quickly. Teachers also considered KOMETA media practical, reusable, and suitable for the characteristics of Grade III students.

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The attractiveness of the media was also supported by the integration of environmental sustainability values into the comic content. This integration made learning not only emphasize understanding metamorphosis, but also instill moral values such as protecting animal habitats, not damaging the environment, and preserving nature. These messages are very important in developing environmental awareness from an early age.

Thus, KOMETA media was not only visually attractive, but also attractive in content because it contained educational values aligned with the objectives of IPAS learning.

4. The Use of KOMETA Media in IPAS Learning

KOMETA media can serve as an innovative solution to improve the quality of IPAS learning in elementary schools. This media is able to help teachers deliver abstract material in a more concrete manner. In addition, it also increases students' learning motivation, classroom activity, and learning outcomes.

The success of KOMETA media shows that the use of comic-based media can be one of the learning strategies appropriate to the characteristics of elementary school students. This media can also be further developed for other IPAS materials so that learning becomes more varied and enjoyable.

CONCLUSION

Based on the results of the research and development process, KOMETA (Metamorphosis Comic) media integrated with environmental sustainability in Science and Social Studies (IPAS) learning for Grade III students at SDN Kamal 2 Bangkalan was declared feasible for use as a learning medium. This feasibility was assessed from the aspects of validity, effectiveness, and attractiveness, which had been tested through expert validation and trials involving students.

The validation results showed that KOMETA media was categorized as highly valid, with validation percentages of 95% from material experts, 92% from learning media experts, 90% from instructional design experts, and 98% from language experts. The media was also declared effective based on classical learning mastery of 85%, teacher activity of 95%, and student activity of 94.5%, indicating that the learning process was active and aligned with the intended objectives.

In addition, KOMETA media was considered highly attractive based on teacher responses of 95% and student responses of 98.6%. Therefore, KOMETA media can be used as an innovative learning medium capable of helping students understand metamorphosis material more concretely while instilling environmental sustainability values in IPAS learning at the elementary school level.

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