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Analysis of the Needs of SiCerMa (Human Digestive System) Interactive Media Based on Problem Based Learning in Grade V Elementary School Students

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Abstract

The lack of optimal use of learning media in the classroom is one of the factors causing the low science learning outcomes of grade V elementary school students, especially the material of the human digestive system. The purpose of this study is to analyze the needs of SiCerMa media as a support for learning material on the human digestive system. The subjects of this study are 30 students and 30 teachers. The method used is quantitative with ADDIE's development model focusing on needs analysis. The data collection technique is by distributing questionnaires. The data analysis technique uses analysis from Milles Huberman. The results of the study showed that 93% of the student needs analysis questionnaire was obtained while 90% of teachers said that they needed PBL-based Si CerMa interactive media to improve the science learning outcomes of grade V elementary school students. In conclusion, information was obtained that teachers and students alike need concrete learning media that are interesting and interactive to help facilitate the understanding of the material of the human digestive system.
Keywords: Needs analysis, interactive media, science

Introduction

Social studies learning is a compulsory subject in the elementary school curriculum. According to Rahmawati (2023), science is a science that studies natural events, material phenomena, and their relationship to each other. Science learning is a basic need for students, so it needs to be emphasized in terms of learning quality (Nuryanti, 2022; Wedyawati & Lisa, 2019). IPAS is the integration of natural sciences and social sciences in the curriculum with the aim of developing a more holistic, multidisciplinary, and contextual education. With IPAS, students can understand the relationship between scientific and social aspects in daily life (Ministry of Education and Culture, 2021). The main components in IPAS learning (Suhelayanti et al., 2023) are 1) clear and specific learning objectives, 2) learning strategies must be in accordance with the characteristics of students, 3) materials chosen in accordance with culture, 4) assessment and learning design must be prepared in advance, 5) learning models must be appropriate to facilitate IPAS learning.

Social science knowledge is taught not only through theory, but requires data collection for example through experiments, observations and deductions to produce a reliable explanation of a phenomenon. The hope of learning social studies is for students to know natural events that often occur in the surrounding environment. IPAS in elementary school is very helpful for students to learn individually and with science is able to provide new knowledge sourced from direct experience and scientific exploration of the surrounding environment. Therefore, in

learning science in its delivery, it must be good with the hope that students will absorb learning concepts that are in accordance with the objectives of elementary science learning.

However, the reality in the field is that IPAS is one of the learning that is considered difficult, because it is abstract. The material in science learning is very broad in scope and many children have difficulty in understanding the material of the human digestive system. Teachers only explain the material of the human digestive system from printed books, posters or using teaching aids. Printed books and posters are still less effective because students still have difficulty imagining how the shape and location of digestive organs in the human body are. The Human Digestive System material is material that trains students to think about scientific knowledge and practice process skills, trains students to make direct observations, knows what substances are contained in the food they eat and their functions for the body, is able to know the digestive apparatus and glands used when carrying out the process of digesting food (Atikasari, 2022).

Based on the preliminary study that has been carried out previously from the results of observations and interviews of teachers and students in grade V of SDN Kertosari 01, SDN Kaibon 01 stated that the implementation of science learning in class V still uses conventional methods. The teacher explained the material "Human Digestive System", the teacher only used learning media in the form of simple pictures, textbooks. Students lack enthusiasm and have difficulty concentrating during learning. The results of interviews with several students stated that learning media in the form of simple pictures makes it difficult for students to understand the material, and here the important role of a teacher in building innovative, fun learning is very necessary.

The role of a teacher is required to have the competence to manage information, utilize the right media, choose creative and innovative learning methods and models. According to Firmadani (2020), media is one of the alternatives used by teachers to deliver material in the classroom. If associated with current technological developments, the use of interactive media is the right choice because it combines various information in the form of text, video, audio, and images, resulting in interesting and easy-to-understand information (Hafid et al, 2023). The science learning process has abstract concepts that cause misunderstandings and conceptualizations that make it difficult for students to understand learning. In materials that are difficult for students to understand, teachers use interactive learning media that can help students understand the material (Irfan et al., 2019).

Previous research that is the basis for this research includes: 1) Dhea Research (2024) entitled Analysis of the Development Needs of Virtual Reality Media for the Digestive System to Improve Critical Thinking in Elementary School Class V. The results of the questionnaire are that most teachers need digital-based learning media, teachers agree that Virtual Reality media can trigger students' critical thinking skills and students feel as if they are in a visualized display. 2) Putri et al., (2023) the results of the study show that teachers urgently need other learning media such as quartet cards in science learning PBL-based human digestive system material that are able to support or facilitate students to be able to understand the material and also understand the material explained in the learning process. 3) Arum (2021) The results of the design of the required learning media, which are based on ICT, can facilitate learning modalities, because they are equipped with images, sounds, and touches that are able to facilitate visual, auditory, and kinesthetic learning styles.

Although previous research has shown that the need for learning media can create direct interaction between students and learning resources, and students can learn independently (Audia et al., 2021), it needs to be further reviewed. The researcher concluded that the use of media in classroom learning is a need that cannot be ignored. The learning media used must be

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able to attract students to learn so that the learning carried out will be in accordance with the goals to be achieved. The novelty of this study is how the researcher analyzes the needs of Si CerMa media for teachers and students from the distribution of questionnaires because Si CerMa media is an interactive media based on Problem Based Learning which consists of instructions for use, developer profiles, materials, PBL-based LKPD, games with different levels, and also evaluations. PBL-based Si CerMa media is a stand-alone media or a website-based independent platform.

Method

The type of research used is quantitative with a focus on needs analysis. Quantitative research is the definition, measurement of quantitative data, and objective statistics through scientific calculations derived from a sample of respondents who were asked to answer a number of questions about surveys to determine the frequency and percentage of respondents (Soesana et al., 2023). The research was carried out with the target of SDN Kertosari 01 and SDN Kaibon 01. The population in this study is grade V students in group 51 of Geger District, Madiun. The sample of this study is students from SDN Kertosari 01 and SDN Kaibon 01 with a total of 30 students. The reason for the selection is because it represents the characteristics of public elementary schools with learning problems that are relevant to the focus of media development. Both schools have an adequate number of subjects, good research accessibility, and show the need for learning media innovation, so they are suitable as a source of data in the needs analysis stage. And also teachers in the Geger District cluster totaling 30 fifth grade teachers.

The type of data used is primary data obtained through the distribution of needs analysis questionnaires to respondents. Questionnaires are a data collection technique by giving a set of questions or written statements to respondents to answer (Huda & Hermina, 2024). The purpose of the questionnaire is to obtain information from students and teachers about learning the human digestive system, interactive learning media. Through the questionnaire, student and teacher response data were obtained about the needs and expectations of learning the human digestive system using PBL-based Si CerMa interactive media. The needs analysis questionnaire prepared by the researcher uses the Guttman scale guideline which will later get a firm answer of "yes-no" (Sugiyono, 2020).

The questionnaire instruments in table 1 are compiled based on Mayer's theory and Piaget's and Vygotsky's theories of Constructivism. The two theories support the importance of interactive learning media and digital access in improving students' interactivity, understanding, and accessibility to human digestive system materials. According to Nurhatmi (2025), the theory of *Cognitive Theory of Multimedia Learning* was put forward by Mayer (2009), focusing on 1) how the human brain works cognitively in receiving and processing information, 2) emphasizing media design so that it is visually and auditory adjusted, 3) the use of animation of digestive organs, audio narration, short texts, and segmentation of material (mouth, stomach, intestines, etc.) so that information is easy to understand without burdening students' memory. Meanwhile, the theory of constructivism (Judijanto et al, 2025) focuses on 1) the learning process as an active construction of knowledge by students, 2) emphasizing student involvement in understanding, exploring, discussing, and building their own understanding, 3) the application of constructivism can be seen in PBL-based LKPD, quizzes, and educational games that encourage students to discover concepts through real problem-solving, not just information.

The research procedures carried out by the researcher are in accordance with development steps that focus on needs analysis. The steps are as follows: 1) preliminary study by conducting

initial observation and identification of learning problems in the target school. The goal is to find the gap between ideal conditions and real conditions on the ground. 2) The preparation of the questionnaire instrument is based on theoretical studies and observation results, then the questionnaire is developed with closed questionnaire items in the form of the Guttman scale (Yes = 1, No = 0).
Then the content (expert judgment) is validated to ensure the suitability of the indicators with the research objectives. 3) Determine the research subject purposively in accordance with the goals of media development. 4) Distribution of questionnaires directly to teachers and students with technical explanations of filling. Respondents were asked to answer according to their actual conditions and needs. 5) Processing the data that has been collected tabulated in the form of a frequency table. The following is table 1 of a questionnaire grid for student needs and teacher needs.

Table 1. Questionnaire Grid for Student and Teacher Needs Analysis

No.	Measured Indicators
Student Needs Analysis	
1	Difficulty Levels of Learning on Specific Material
	The Need for Alternative Learning Resources
	Basic Needs for Digital Learning Media
	Media Portability and Accessibility Needs
	Multi-Device Compatibility Requirements
	The Need for Media to Improve Learning Outcomes
	The Need for Integrated and Engaging Media
	The Need for Multimedia and Basic Gamification
	The Need for a Fun Form of Evaluation
	Approval and Support for Specific Medi Development
Teacher Needs Analysis	
2	Digital media usage habits
	Consistency in the application of digital media
	Teacher's analytical abilities
	Inhibiting factors (technical, facilities, time, competence) in media development
	Direct experience with Si CerMa's media on certain materials.
	The level of awareness and information about Si CerMa's media.
	Teachers' functional needs for interactive media
	Perception of student attraction and engagement through interactive media.
	The need for media development for learning purposes and improving learning outcomes.
	Awareness of the importance of regular and structured media evaluation.

The data analysis technique using the Guttman measurement scale reference has only 2 choices, the positive choice "Yes" is usually considered to have a value of 1 point. While the negative answer "No" is 0 points. After scoring, the questions are calculated by way of percentage (%) of the answer to the question, to find out the knowledge of the respondents, using the following formula (Arikunto, 2020).

$$\mathbf{P = a/b \times 100\%}$$

Remarks
P : Percentage

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a : Number of positive questions
b : The sum of all questions
Percentage criteria
Categorized as good, if 76-100% of the answer is positive
Categorized as sufficient, if the answer is 60-75% positive
Categorized as less, if the answer < 74% of the answer is positive

Results

The questionnaire instrument in this study is intended to map more comprehensively the urgency of developing Si CerMa's interactive learning media in the field. The respondents consisted of 30 students from two elementary schools and 30 teachers. For teacher respondents, the researcher distributed a questionnaire during the Class V Teacher District KKG activity which was attended by representatives of grade V teachers in Geger District at 09.00 at the laboratory of SDN Kertosari 01 on July 22, 2025, while respondents of 30 students from two elementary schools filled out a questionnaire on July 23, 2025 in class. The questionnaire was analyzed in quantitative descriptive manner using the percentage of yes and no answers. As a result, the analysis of this questionnaire is used as an empirical basis in determining the needs for the development of Si CerMa's interactive media, so that the media developed is in accordance with the real conditions of learning and the needs of users in the field. The results of the student needs analysis questionnaire are in table 2 below.

Table 2. Results of the student needs analysis questionnaire

No.	Measured Indicators	Answer "Yes" (n/%)	Answer "No" (n/%)
1	Difficulty level of learning in specific material	93.3%	6.7%
2	The need for alternative learning resources	96.7%	3.3%
3	Basic needs for digital learning media	90%	10%
4	Media portability and accessibility needs	86.7%	13.3%
5	Multi-Device compatibility requirements	83.3%	16.7%
6	The need for media to improve learning outcomes	100%	0%
7	The need for an integrated and engaging media	96.7%	3.3%
8	The need for basic multimedia and gamification	93.3%	6.7%
9	The need for a fun form of evaluation	90%	10%
10	Approval and support for the development of specific media	100%	0%
	Average	**93%**	

Based on the results of the analysis of the student needs questionnaire in table 2, it was found that the material of the human digestive system is still difficult to understand by most students (93.3%) if delivered conventionally. This encourages the need for alternative learning resources (96.7%) and digital learning media (90%). From the technical aspect, students want media that is portable and accessible (86.7%) and compatible with various devices (83.3%). All

students (100%) agree that learning media is needed to improve learning outcomes, and almost all (96.7%) want integrated and engaging media.

Students show a need for basic multimedia and gamification elements (93.3%) as well as fun forms of evaluation (90%). Overall, there is full agreement and support from students (100%) for the development of specific learning media. This finding is an empirical basis that the development of interactive media "Si CerMa" is very relevant and contextual to answer the real problems and needs of students in the field.

Table 3. Results of the teacher needs analysis questionnaire

No.	Indicator	Yes (n/%)	No (n/%)
1	Using learning media other than books/lectures	23,3%	76,7%
2	Identifying students' difficulties on IPAS	70,0%	30,0%
3	Using digital media in learning	60,0%	40,0%
4	The use of digital media has been consistent	40,0%	60,0%
5	Requires concrete/visual media	66,7%	33,3%
6	Need interactive learning media	90,0%	10,0%
7	Interactive media increases student activity	86,7%	13,3%
8	Interactive media makes it easier to understand IPAS	93,3%	6,7%
	Average	66,25%	

The results of the analysis of teacher needs questionnaire show that social studies learning is currently still dominated by conventional methods, with 76.7% of teachers admitting that they have not used media other than textbooks and lectures. Although 70.0% of teachers are aware of students' learning difficulties and 60.0% have come into contact with digital media, their use is not optimal because the level of consistency of use is still low (40.0%). There is a gap between the needs and realities of learning, which drives the high need for media updates. As many as 66.7% of teachers need concrete or visual media to explain complex concepts, and 90.0% state that they urgently need the development of interactive learning media. Respondents believe that interactive media will not only increase student activity (86.7%), but also make it easier to understand the concept of social studies (93.3%). These findings provide a strong empirical foundation for the development of Si CerMa's interactive media to answer real needs and expectations in the field.

Discussion

The results of the needs analysis show that there is a significant gap between the current IPAS learning practices and the expected ideal conditions. The dominance of conventional methods (76.7%) and the lack of use of learning media other than textbooks confirm the research findings that learning in elementary schools still tends to be monotonous and teacher-centered (Tiarawati et al., 2025). This condition has implications for low student activity and understanding, where 70.0% of respondents are aware of learning difficulties. These findings are in line with research that reveals that conventional learning without adequate media support causes students to be passive, bored quickly, and learning outcomes tend to be low (Yanti, 2025). Interestingly, although 60.0% of respondents have been in contact with digital media, the level of consistency in its use is only 40.0%. This indicates that there are obstacles in integrating technology in a sustainable manner, which can be caused by the limited competence of teachers in designing interactive digital media (Imamah et al., 2025) or the lack of optimal utilization of

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available facilities. This gap between the availability of tools and pedagogical utilization strengthens the argument for the need for media that is not only available, but also ready-to-use and easily integrated by teachers (Setiawan et al., 2023).

The most significant finding was the high need for the development of interactive learning media (90.0%), which respondents believed could increase student activity (86.7%) and facilitate the understanding of IPAS concepts (93.3%). This belief has a strong theoretical and empirical foundation. Research by Lathifah et al. (2024) proves that digital-based interactive learning media is more effective in improving learning outcomes than conventional media. Rahmawati (2019) and Hirzi (2025) emphasized that interactive multimedia not only improves learning outcomes but also motivates students to learn independently Interactive media is able to create a more interesting and meaningful learning experience because it involves more than one sense (sight and hearing), thereby increasing students' absorption of material (Mayer, 2009).

The need for concrete or visual media (66.7%) reflects the cognitive characteristics of elementary school students who are at the concrete operational stage (Piaget, 1970). Students need real objects or visual representations to understand abstract concepts, such as the human digestive system or other IPAS material (Suryani et al., 2025). Interactive media such as animated videos or digital simulations can bridge this by presenting abstract concepts in a more concrete, dynamic, and interesting way (Ningsih et al., 2025). Other studies also confirm that the use of visual media, both in the form of picture cards and videos, can significantly improve students' understanding of concepts (Budianti et al., 2024)

Furthermore, respondents' belief that interactive media can increase student activity is supported by empirical evidence showing that there is a significant influence of the implementation of interactive learning media on student participation (Wahyuni et al., 2025). Well-designed interactive media provide a space for students to not only hear the teacher's explanations, but also see, interact, and explore the material independently (Khoerunnisa, 2025). Media innovation with interactive technology has been proven to be able to increase student engagement, both cognitively and emotionally, so that they are more motivated and easier to understand the material (Widiastari et al., 2024).

Thus, the development of interactive media "Si CerMa" gets a strong justification from the needs data and literature review. This media is designed not only as a material presenter, but also as a means to create active, creative, and fun learning, as well as optimize students' understanding of IPAS material (Arsyad, 2019). The interactive features, engaging visualizations, and gamification approach planned in "Si CerMa" are in line with the principles of effective learning media that are able to improve student motivation, participation, and learning outcomes (Riatmaja et al., 2025).

Conclusion

Based on the results of the needs analysis that has been carried out, it can be concluded that the development of Si CerMa (Human Digestive System) interactive media based on Problem Based Learning is very urgent and relevant to be carried out. The learning of social science of the human digestive system material in grade V of elementary school is still dominated by conventional methods which have an impact on students' low understanding (93.3% experience difficulties) and learning outcomes (83% are incomplete).

Analysis of student needs shows that the average needs reach 93%, with 100% of students supporting the development of interactive media that is portable, compatible on various devices, and equipped with multimedia, gamification, and fun evaluation. From the teacher's side, 90% stated that they urgently need interactive media because existing digital media has not been

used consistently (only 40%). Teachers believe that interactive media can increase student activity (86.7%) and make it easier to understand concepts (93.3%).

The development of Si CerMa is based on Mayer's theory (multimedia learning) and Piaget and Vygotsky's constructivism, and is integrated with the Problem Based Learning model to develop students' critical thinking skills. Thus, this media is expected to be able to answer real needs in the field, help students understand abstract concepts concretely, increase activeness, and ultimately improve the learning outcomes of social studies for grade V elementary school students.

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