NEED ANALYSIS FOR THE DEVELOPMENT OF LKPD BASED ON SOCIOSCIENTIFIC-STEAM IN THIRD-GRADE ELEMENTARY SCHOOL IPAS LEARNING

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Abstract

Elementary science and social studies (IPAS) learning under the Independent Curriculum requires the integration of theoretical concepts with empirical realities in students' environments. The life cycle material in third-grade elementary school is often abstract and difficult to internalize through conventional texts alone. This study aims to deeply analyze the needs of students and teachers as an essential foundation for developing Student Worksheets (LKPD) based on Socioscientific-Issues (SSI) integrated with Science, Technology, Engineering, Arts, and Mathematics (STEAM) oriented towards Education for Sustainability. This study employed a qualitative approach with a descriptive research type. The research subjects involved 21 third-grade students and one third-grade teacher at SDN Banyuajuh 5. Data collection techniques were carried out through student response questionnaires, in-depth interviews, participatory observations, and literature reviews. The analysis results showed that 95.23% of students had high enthusiasm for IPAS learning and environmental awareness, but 90.47% experienced obstacles in understanding animal life cycle material through linear written texts and required visuals and hands-on practice. In addition, variations in basic literacy skills were identified where a small number of students required special assistance. These findings confirm the urgency of developing contextual, highly visual, communicatively phrased Socioscientific-STEAM-based LKPD featuring creative projects in the form of 2D storyboard creation to accommodate the learning needs of all students inclusively.

Keywords: *Needs Analysis, Student Worksheet, Socioscientific-Issue, STEAM, IPAS, Elementary School.*

A. INTRODUCTION

Education at primary school level plays a fundamental role in establishing a framework for critical and creative thinking, as well as social awareness, in pupils to enable them to tackle the complexities of the 21st century. Within the structure of the Merdeka Curriculum, the content of Natural Sciences and Social Sciences is integrated into a single subject known as Natural and Social Sciences (IPAS) (Wijayanti & Ekantini, 2023). This integration is designed to enable pupils to examine natural phenomena and social realities in a holistic, comprehensive and meaningful manner. The implementation of IPAS teaching and learning requires a paradigm shift from one-way knowledge transmission towards an active learning process that links subject concepts to real-life contexts in the learners' immediate environment (Andeswari et al., 2022; Prabandari et al., 2022).

In Year 3 of primary school, one of the key areas of the IPAS curriculum is an understanding of the life cycles of living organisms (animals and plants). Ontologically speaking, this subject matter requires a systematic grasp of biological stages. However, the characteristics of life cycle material are often abstract for primary school-aged children who are in the concrete operational stage, as the processes of animal growth and metamorphosis cannot always be observed directly within a short period (Novitasari et al., 2026). Reliance on

conventional textbooks with few illustrations often leads to learning fatigue and hinders pupils' optimal conceptual understanding. Therefore, this subject area urgently requires teaching materials and media that are innovative, communicative, and capable of visualising processes more concretely (Aisyah et al., 2025; Koto & Winarti, 2022).

To address these challenges, innovation is required in the provision of teaching materials, one example being the development of Student Worksheets (LKPD) combined with a cutting-edge learning approach, namely the Socioscientific-Issue (SSI) approach based on Science, Technology, Engineering, Arts, and Mathematics (STEAM). The SSI approach enables pupils to investigate social issues with a scientific dimension—such as habitat degradation, environmental pollution and the threat of species extinction—thereby stimulating moral sensitivity and ecological awareness (Azzahro & Suryanti, 2025). When SSI is integrated with the STEAM framework and focused on Education for Sustainability (EfS), pupils are not merely encouraged to understand science in theoretical terms, but are also guided to design creative works or engineering solutions to real-world problems that support environmental sustainability (Atiaturrahmaniah et al., 2022; El Magheest & Suryanti, 2025). Empirically, the development of STEAM-based teaching materials has proven effective in improving subject mastery, 21st-century skills and life skills among primary school pupils (Carlian et al., 2025; Haifaturrahmah et al., 2020; Zullafa Ery Perdani et al., 2023).

Despite the high urgency for instructional material innovation, empirical findings from a preliminary study at SDN Banyuajuh 5 reveal that the Natural and Social Sciences (IPAS) learning process remains dominated by expository lecture methods and the use of a single textbook. The available student worksheets (LKPD) are conventional, merely containing brief material summaries and cognitive evaluation items without facilitating environmental issue investigations or creative projects. This condition is further exacerbated by the heterogeneity of students' abilities in the classroom, including a small number of students who require special assistance in basic literacy aspects. Therefore, a deep and systematic needs analysis is absolutely essential to map the factual conditions and formulate specifications for inclusive and contextual learning materials. The urgency of this initial identification aligns with various previous studies emphasizing that the development of sustainable-oriented LKPD and E-LKPD instruments must be based on the needs analysis of both educators and students (Purwanto & Herlina, 2024; Ummu & Usman, 2023).

Based on this background, this study aims to describe and analyze the needs of students and educators in depth as an essential foundation for developing Socioscientific-STEAM-based IPAS student worksheets oriented toward Education for Sustainability on life cycle materials in third-grade elementary school.

B. METHOD

This study employs a qualitative approach of a descriptive nature. The descriptive qualitative approach was chosen because it aims to understand, describe and analyse social phenomena and the factual conditions of the learning process in the classroom in a thorough, comprehensive and natural manner, without subjecting the objects of study to any special treatment (Wiksana, 2017).

The research was conducted at SDN Banyuajuh 5, Bangkalan Regency. The research subjects were selected using purposive sampling, which involves selecting subjects based on specific criteria, believing them to have an understanding of the issues and the data required in the field (Prabandari et al., 2022). The subjects comprised one Year 3 teacher and all Year 3 pupils, totalling 21 individuals. The selection of participants was based on the consideration that the teacher and pupils were the key actors who directly experienced the dynamics of the IPAS learning process at the target school.

Data collection was carried out using four main instruments to ensure the validity of the information: (1) a Learner Needs Questionnaire (Yes/No options) to gather empirical data on interests, learning styles and preferences regarding teaching materials; (2) In-depth interviews with Year 3 teachers to explore pedagogical challenges and pupils' literacy characteristics; (3) Direct participatory observation in the classroom; and (4) Library research to examine relevant scientific literature.

Qualitative data analysis is carried out through a series of interlinked stages, which include data reduction, data presentation (in the form of descriptive percentages), and drawing conclusions (Prabandari et al., 2022). To ensure the validity of the data, the researchers applied source triangulation techniques.

Description:

P = Percentage of pupil responses

f = The number of pupils who gave a particular answer

N = The total number of pupils (N=21).

C. RESULTS AND DISCUSSION

The distribution of a needs questionnaire to 21 Year 3 pupils at SDN Banyuajuh 5 yielded empirical data, which is summarised in Table 1 below.

Table 1. Results of the Analysis of the Learners' Needs Questionnaire (N=21)

No.	Question Indicators	Yes	Percentage
1	Likes IPAS class	20	95,23%
2	Difficulty memorizing the life cycles of animals from the text by	19	90,47%
3	Get bored if learning consists only of lectures and reading textbooks	18	85,71%
4	Understand lessons more quickly if you look at colourful pictures	19	90,47%
5	More enthusiastic about learning when they are taken to see animals and plants in person	18	85,71%
6	Enjoy discussing topics and working on group assignments	20	95,23%
7	Ever been asked by a teacher to make a piece of artwork or a craft item	5	23,80%
8	Enjoy being given fine motor skills activities (cutting, sticking, drawing)	17	80,95%
9	Exciting when your work is displayed in front of the class, isn't it	16	76,19%
10	Be aware that a dirty environment or litter can make animals fall ill or die	20	95,23%
11	Like to learn some simple ways to keep the environment healthy	20	95,23%
12	Recognising the importance of creating messages encouraging environmental cleanliness	19	90,47%
13	Do you agree to use the new LKPD, which contains more pictures	20	95,23%
14	Prefer worksheets that include fun instructions for creating art pieces.	19	90,47%
15	Agree that LKPD is encouraging the creation of a "2D"	19	90,47%

According to Table 1, the learners' intrinsic motivation towards IPAS is very high (95.23 per cent). However, there are cognitive difficulties, with 90.47 per cent of learners finding it difficult to understand the life cycle material through linear text and preferring colourful visual illustrations and hands-on activities.

Interview results confirmed that classroom dynamics were characterized by a high level of activity alongside literacy heterogeneity, in which a small number of students (around 3 children) required specialized reading guidance. Learning resources had been limited to mandatory textbooks and conventional student worksheets consisting of written practice questions, completely lacking environmental issue content or creative projects. Field observations indicate that teaching remains teacher-centred. Pupils with literacy difficulties appear to fall behind when faced with lengthy narrative texts, and arts-based project activities have not yet been incorporated (Arts).

The findings of the needs analysis revealed a significant pedagogical gap between the cognitive characteristics of the pupils and the availability of teaching materials. The high percentage of pupils who found it difficult to understand the life cycle material through linear texts (90.47 per cent) stood in stark contrast to their high level of enthusiasm and concern for the environment (95.23 per cent). This fact indicates the presence of a cognitive bottleneck: Year 3 pupils, who are in the concrete operational stage, actually possess high motivation to learn; however, conventional teaching methods fail to accommodate their learning styles. Therefore, abstract material such as the life cycles of living organisms urgently requires the support of communicative media capable of visualising processes in a concrete manner (Aisyah et al., 2025; Koto & Winarti, 2022).

To bridge these gaps, the integration of the Socioscientific-Issue (SSI) approach is highly relevant. Through SSI, biological material on the life cycles of animals is no longer taught as a rigid set of stages to be memorised, but is contextualised directly within the local ecological reality—such as the impact of rubbish dumps on the survival of wildlife (Azzahro & Suryanti, 2025). On the other hand, the STEAM framework provides a platform for the understanding of these socio-scientific issues to be translated into tangible outcomes through project-based learning (Novitasari et al., 2026). This holistic approach has been empirically proven not only to enhance scientific literacy but also to develop life skills and 21st-century critical thinking skills (Atiaturrahmaniah et al., 2022; Haifaturrahmah et al., 2020; Zullafa Ery Perdani et al., 2023).

Furthermore, this approach offers an inclusive pedagogical solution. Findings from interviews, which identified a small proportion of pupils with basic literacy difficulties, emphasise that learning must not be biased towards the ability to read text alone. Kinesthetic, engineering and arts (Arts & Engineering) activities within STEAM provide an alternative pathway for these pupils to continue to internalise the concept of the life cycle in a meaningful way without falling behind their peers.

Referring to the aforementioned urgency and in line with the demands of a curriculum oriented toward Education for Sustainability (El Magheest & Suryanti, 2025; Purwanto & Herlina, 2024), the ideal characteristics of the LKPD that need to be developed must encompass three main specifications:

(a) Contextual and Based on Real-Life Problems (SSI): The LKPD must present stimuli in the form of authentic phenomena relating to threats to wildlife conservation in the local environment. The aim is to transform IPAS learning from a mere transfer of knowledge into a forum for investigation or inquiry that fosters pupils' moral sensitivity and analytical skills from an early age (Sholihah et al., 2024).

(b) Visual Scaffolding and Communicative Language: To address the issues of boredom and low basic literacy, worksheets must minimise the use of lengthy narrative text. The presentation should be dominated by visual layouts, colour illustrations and pictogram-

based instructions. These visual adaptations not only facilitate conceptual understanding but also pave the way for adoption in electronic form (E-LKPD) should school infrastructure support this in the future (Fitriani et al., 2024; Ummu & Usman, 2023).

(c) Creative Project Content (Arts & Engineering)): LKPD should not be limited to cognitive assessment through written questions, but should guide pupils to take concrete action (Carlian et al., 2025). The final project, involving the creation of a '2D Storyboard', was chosen because it systematically represents the chronological sequence of the life cycle (egg, larva, pupa and adult stages) whilst also providing a platform for pupils' artistic creativity in crafting a message encouraging the preservation of environmental cleanliness.

D. CONCLUSION

Based on the results of a needs analysis conducted through questionnaires, in-depth interviews, participatory observation and a literature review in Year 3 at SDN Banyuajuh 5, it was concluded that there is an urgent need to develop Socioscientific-STEAM-based IPAS Student Worksheets (LKPD) focused on Education for Sustainability within the life cycle curriculum. Current teaching remains conventional in nature, failing to address environmental issues or incorporate creative projects. The required LKPDs must be designed contextually, rich in colourful visual illustrations to accommodate the diversity of pupils' literacy abilities, including those requiring special reading support, and must include a creative project involving the creation of a 2D storyboard. These findings provide a valid empirical basis for moving on to the next stages of product design and development.

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