



IMPROVING SCIENCE PROCESS SKILLS USING GUIDED INQUIRY-BASED STUDENT WORKSHEET

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ABSTRACT

The use of conventional student worksheets, such as those from publishing companies, the internet, or the ready-made ones where the teacher is not involved in the planning, or preparation process, can cause students to be less active in learning and not meet the needs of students and their learning objectives. This can be overcome by using guided inquiry-based student worksheets, which can increase students' creativity. This student worksheet is very suitable for the needs of students. This paper aims to describe guided inquiry-based student worksheets to improve the science process skills through a review of relevant literature. The results of the literature review explain that guided inquiry-based student worksheets can improve students' science process skills because they are can practice hypothesizing, identifying tools and materials, analyzing data, and concluding investigation results. Based on the results of literary studies, it can be concluded that guided inquiry-based student worksheets can have a positive effect on science learning.

Keywords: *Student Worksheet, Science Process Skills, Guided Inquiry.*

1. INTRODUCTION

The 21st century has brought about changes in nearly every field, including education. These changes have been particularly noticeable in the area of curriculum utilized in the current educational system—the independent learning curriculum. Students and teachers need to be able to adjust to changes in the curriculum, particularly when it comes to the teaching and learning process. Educators must offer educational opportunities that motivate learners to enhance their aptitudes and proficiencies.

Primarily, science education stresses hands-on experiences to build skills so that students can investigate and comprehend the natural world from a scientific perspective (Trianto, 2012). This is very much in line with the independent curriculum, which gives teachers the freedom to select, create, and develop instructional materials that can be tailored to each student's individual learning needs while also allowing students to choose the course of their education, select teaching materials, and decide how to evaluate them (Ministry of Education and Culture, 2022). The curriculum necessitates that students acquire 21st-century skills and soft skills like critical thinking, teamwork, communication, creativity, and moral integrity. Therefore, appropriate student worksheets that can highlight the nature of science in a balanced way and comply with curriculum standards are required to support teachers in creating lessons that can help students develop their Sains Process Skills. The teaching resources, particularly the student worksheet, must meet the learning objectives listed in the Pancasila student profile, according to the independent curriculum analysis. Learning outcomes are a set of information, abilities, and attitudes that come together to form comprehensive and ever-evolving competencies.

The use of student worksheets as instructional materials has a significant impact on the process of teaching and learning, so their creation must adhere to several specifications, including didactic, technical, and construction requirements. One type of instructional resource that teachers can create to



assist in-class activities is the student worksheet. These worksheets can be used in conjunction with other learning resources, such as laboratories. The way that lesson content is presented in student worksheets involves delivering the information succinctly and involving students in interactive activities such as practice questions, discussions, and easy experiments. In addition, creating relevant worksheets for students can help them improve their science process skills (Widjajanti, 2008).

According to the quote above, student worksheets are among the most crucial teaching tools for science classes, particularly physics classes, as they help students become more active investigators and develop their scientific process skills. In addition to not taking into account the needs of the students, student worksheets used in schools frequently still rely on publishers' services or can be downloaded from the internet. They also frequently use worksheets that are simply used without any planning, preparation, or arrangement. Such student worksheet steps do not prioritize the process and are not situational, which means they do not develop process skills and do not meet the needs of the learners.

To effectively teach science, science teachers must train or develop process skills because they play the following roles: they help students learn how to develop their minds; they give students opportunities to make discoveries; they improve memory; they give students an intrinsic sense of satisfaction when they succeed; and they aid students in understanding science concepts.

According to the above description, to implement learning more effectively, teaching materials are required to support more effective learning. For instance, teaching materials in the form of student worksheets can be developed and combined with a guided inquiry learning model to improve the quality of learning, thereby improving science process skills and involving students actively in the learning process.

2. METHODS

This study employs a literature review or literature study methodology. To conclude the discussion, data is gathered for analysis and subsequently presented in the discussion results. The research's findings are presented as a percentage of pertinent journal articles on guided inquiry learning models or techniques that, when combined with student worksheets, can improve students' science process skills. The study's methodology involved developing a worksheet for students to use to improve their science process skills, which was then presented to several relevant research journals that covered the guided inquiry model.

3. RESULTS AND DISCUSSION

A student worksheet is one type of teaching material that is used in the teaching and learning process and can be utilized by both teachers and students to aid in the learning process (Kosasih, 2021). Teachers use the student worksheet as a tool to help students understand the concepts they are teaching them. Teachers will find it easier to teach material and save time with this student worksheet, which will also foster interaction between teachers and students during the learning process. Physics practical instructions, in the opinion of Faizi (2013), should include work steps that involve thought processes, work procedures, creativity, and student independence in learning concepts, principles, rules, or laws of physics.

According to research by Çelikler (2010), student worksheets are very beneficial in the teaching and learning process because they let students actively participate in the process and raise student achievement. Additionally, the findings of Yulianti et al.'s (2015) study indicated that a student worksheet could improve conceptual understanding and science process skills.

Student worksheets serve as a tool to help students acquire knowledge, attitudes, and skills during the learning process. Using student worksheets enables teachers to deliver instruction more effectively,



support struggling students, give reinforcement, and help students develop problem-solving skills. (1988, Dhari and Haryono).

According to Dhari and Haryono (1988), students can utilize student worksheets for the following purposes:

1. Encourage more involvement from students in the process of teaching and learning.
2. Teach and cultivate in students the process skills necessary to apply science.
3. Facilitate the collection of notes regarding the content covered in these exercises.
4. Contributes to the body of knowledge about the ideas being studied by the students' methodical learning activities.

The justification provided above highlights the value of student worksheets, which can increase students' scientific process skills by encouraging increased activity, responsiveness, and creativity. To make the process even more efficient, the student worksheet can also be integrated with a model or learning approach like guided inquiry. In this type of inquiry learning, the teacher helps students gain new insights, notice shifts in their research, and acquire knowledge from their own experiences (Mulyatiningsih, 2013). The use of inquiry learning in the classroom is crucial because it can help students develop their capacity for intellectual discipline and the ability to satisfy their curiosity.

Students are given the freedom to develop the concepts they learn through the use of guided inquiry learning. They have the chance to work together to find solutions to the issues they encounter, and in the classroom, they learn how to engage in social interactions with one another and share information between groups. As stated by Ningrum (2013), the goals of this inquiry-based learning are as follows: (a) enhancing students' problem-solving attitudes and abilities; (b) teaching them to make decisions independently and objectively; (c) fostering scientific thinking skills; (d) fostering curiosity about a phenomenon; (e) fostering investigative skills; (f) fostering the ability to explain logically; (g) fostering abilities in cognitive and affective aspects; and (h) fostering the development of students' capacity for learning new information.

Inquiry learning, according to the aforementioned viewpoint, aims to develop process skills by guiding investigative activities and providing logical explanations, allowing students to develop their ability to think critically to obtain new information. This is consistent with the findings of a study conducted in 2013 by Siska et al., who found that using guided inquiry learning greatly improved students' science process skills. This is also consistent with the findings of a study conducted by Ramadhani et al. (2023), which indicated that pre- and post-test results were used to measure effectiveness and show an improvement in students' science process skills following the use of guided inquiry learning models and student worksheets as learning tools.

Because the guided inquiry method's syntax aligns with the scientific approach, which involves students making direct observations of real phenomena and processes through scientific investigation, it is a highly appropriate combination to use with student worksheets. Through this process, learning becomes more student-centered and encourages students to be more creative and active, which improves learning outcomes and their ability to use their sense of self. The aforementioned statement aligns with the findings of Annafi et al. (2015) study, which indicates that employing guided inquiry-based student worksheets can enhance students' learning outcomes, knowledge, attitudes, and skills when compared to students who do not use such resources. Aryani and Nana (2020) noted in their literature review that one potential solution to the challenges faced in enhancing students' science process skills in the classroom is



the guided inquiry model, which is aided by student worksheets. Therefore, using guided inquiry-based student worksheets to implement the independent curriculum is highly appropriate.

The guided inquiry-based worksheet is a learning resource that is created using the guided inquiry learning methodology or by adhering to the guided inquiry syntax. Research by Servitri and Trisnawaty (2018) concludes that the quality of the inquiry worksheets developed is in a good category. Numerous other research findings support the idea that science process skills can be trained and improved through learning using guided inquiry-based student worksheets. According to the research findings of Wulandari and Ismono (2019), guided inquiry-based student worksheets have been proven to be successful in enhancing learning outcomes and developing science process skills. They were also found to be an effective learning medium. A guided inquiry-based student worksheet is a practical and efficient way to help students improve their science process skills, according to research results by Ginting et al. (2020). Consistent with the study findings of Apriliani et al. (2022), which demonstrated that the student worksheet based on guided inquiry was highly feasible, achieving an average score of 3.46. With an average N-Gain score of 0.77 for science process skills and 0.79 for learning outcomes, the guided inquiry-based student worksheet that was created was effective in raising learning outcomes. According to Anisah and Nasrudin's research findings from 2023, as well as other findings, students' science process skills improved when the pretest and posttest data were analyzed using N-gain and scored between 0.70 and 1.00 in a high category.

The above-discussed research results suggest that guided inquiry-based student worksheets can greatly improve students' science process skills. Nevertheless, there are still implementation issues that need to be taken into account when implementing guided inquiry-based student worksheets, such as time allocation, which requires teachers to manage students' time as efficiently as possible throughout the learning process, and preparation of inquiry-based student worksheets, which must be tailored to the subject matter and characteristics of the material because not all of it is appropriate for use as a student worksheet.

4. CONCLUSION

Cognitive or intellectual skills are also a part of the process skills, in addition to psychomotor abilities. The various conversations and research findings that have been presented lead to the conclusion that to effectively teach science, it is essential to provide or develop teaching resources, particularly student worksheets. These resources can inspire students to learn, provide them with the chance to hone a variety of skills and help them uncover scientific concepts through the course of their investigations. Consequently, the standard of student learning and science process skills will rise. The guided inquiry-based learning worksheet for students is highly beneficial and should be developed because it can improve learning outcomes, particularly in terms of developing science process skills.

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