

Student worksheets based on connected type integration models on simple planes and human movement systems: The practical analysis

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Abstract: This study aims to determine how practical the integrated science student worksheets are based on the connected type integration model with simple aircraft material and the human motion system. This type of research was quantitative, which was part of research and development. Research and development is a type of research that aims to make products through practical testing. The test subjects in the research involved 18 class VIII students at SMP Negeri 3 Pulubala. The results of classroom management obtained a score of 96% in the very good category, and the responses of students reached an average score of 63% in the good category. It can be concluded that the development of integrated science student worksheets connected type integration model is practical for use in the learning process.

Keywords: Connected type, practicality, student worksheets

Lembar kerja peserta didik berbasis model keterpaduan tipe connected pada materi pesawat sederhana dan sistem gerak manusia: Analisis kepraktisan

Abstrak: Penelitian ini bermaksud untuk mengetahui seberapa praktis lembar kerja siswa IPA terpadu yang digunakan peserta didik, yang didasarkan pada model keterpaduan tipe connected dengan materi pesawat sederhana dan sistem gerak manusia. Penelitian ini adalah jenis penelitian kuantitatif yang merupakan bagian dari penelitian dan pengembangan. Penelitian dan pengembangan merupakan jenis yang bertujuan untuk membuat produk melalui pengujian kepraktisan. Subjek uji coba dalam penelitian yaitu melibatkan peserta 18 orang peserta didik kelas VIII SMP Negeri 3 Pulubala. Hasil pengelolaan kelas diperoleh skor 96% dalam kategori sangat baik dan respon peserta didik mencapai skor rata-rata 63% dalam kategori baik. Sehingga dapat disimpulkan bahwa pengembangan lembar kerja peserta didik IPA terpadu model keterpaduan tipe connected praktis untuk digunakan dalam proses pembelajaran.

Kata Kunci: Tipe connected, kepraktisan, lembar kerja peserta didik

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INTRODUCTION

Integrated science learning is a product that has existed since the education unit level curriculum to the 2013 curriculum. Integrated science learning tries to combine, blend, and integrate science learning in a unified whole (Astiti et al., 2020). The implementation of integrated science learning is expected, students do not learn each natural science separately, but integrate all materials into a connected whole. With the integration, students will gain knowledge and skills as a whole, making learning meaningful for students.

The integrated science learning process depends on learning resources. According to Setyawati (2022), learning is a process of interaction between students and teachers involving learning resources in a learning environment. Learning resources are all kinds of materials or references used in the learning process to support students' understanding of various natural science concepts, including physics, biology, and chemistry in one unit. Student worksheets are learning resources that are considered to help teachers and students in the integrated science learning process.

In integrated science learning, student worksheets are very important. These worksheets can help learners become more active in the learning process, help them develop concepts, help them discover and develop learning process skills (Muslimah, 2020). According to Pawestri (2020), student worksheets are learning resources in the form of task sheets, instructions for task implementation, and evaluation of learning that must be done by students. In addition, Suwastini (2022) explains that student worksheets consist of a collection of sheets containing activities that allow learners to perform real tasks with the objects and problems they are studying. The conclusion from some descriptions is that the student worksheet consists of various learning process activities that students must do.

Student worksheets are also teaching materials arranged in a systematic and structured manner that allows learners to learn independently. By using student worksheets, students can explore and understand teaching material actively and independently without always having to rely on direct guidance from educators. According to Muslimah (2020), student worksheets can function as a road map for learners to find out, and provide stimulus through various media and student activities, this can also help learners become better social, emotional, moral, and aesthetic communication. Student worksheets also aim to help learners discover new ideas and apply and integrate the ideas they find (Halid et al., 2023; Nasir et al., 2020; Sinambela et al., 2021)

Based on the findings from observations and interviews conducted with science teachers at SMP Negeri 3 Pulubala, researchers found that in science learning teachers have not used student worksheets developed with a connected type learning model both in classroom learning and those using experiments. The worksheets of students taught are still separate, not yet in an integrated manner. So that students still lack good learning motivation. According to the observations of some students, the student worksheets used by teachers are boring and the learning process is less interesting.

Learning problems that occur can be overcome by using a learning model that can motivate students and can understand concepts in the learning process, resulting in interesting learning (Isa et al., 2023; Nasir et al., 2023; Nunaki et al., 2020; Pambudi et al.,

2022). The connected type integrated learning model is one of the models that can be used. According to Maruni et al. (2022), The connected model is an interdisciplinary integrated science learning model that visibly combines different ideas, topics, skills, tasks, and semesters. Rahmat (2016) states that the connected learning model, the meaning of "connected" is not interpreted as connecting several disciplines that have similar characteristics. Each discipline remains in its own position. The meaning of "connected" is meant to connect matter in one discipline. In addition, Suanah (2018) also explained that the connected integrated learning model is that learning can be paired to certain subject parents which are a unity in forming abilities. Haidir (2012) adds that this type of connected integrated learning model is considered to be able to improve the learning outcomes of students because with this learning model students can connect current material with previous material.

As in other learning models, this type of connected integrated learning model has advantages and disadvantages. Connected type integrated learning has several advantages, among others: students (a) gain a broad understanding because of integrating ideas from various fields of study; (b) have the ability to develop concepts consistently so that internalization occurs; (c) the ability to integrate ideas in inter-study fields allows students to examine, conceptualize, improve, and assimilate ideas in problem solving. The weakness of connected learning is that the various subject areas are still separate from each other and do not seem to have a relationship (Taqiya, 2019). By implementing a connected learning model using student worksheets that support integrated learning, it is expected that students will be more motivated, have a high interest in the learning process, be active in learning, and can develop a deeper understanding of natural science.

Simple plane matter is combined between various disciplines, in this case physics and biology. Judging from the discipline of physics which contains the principle of simple aircraft then combined with the discipline of biology which contains material about motion systems in humans. Simple Airplane Working Principle on Human Movement System. In addition to the equipment you commonly use in everyday life, there are also simple aircraft principles that apply to the structure of the human muscles and skeleton, namely in the type of simple aircraft type Lever or lever. The working principle of the lever actually has similarities with the human motion system in the arm which includes the skeleton and the biceps and triceps muscles. Like a lever that has a fulcrum, the work of the arm muscles also rests on the hand joint between the upper arm and forearm.

Based on the problems explained, a practical test will be carried out for student worksheets based on the connected type integration model on simple aircraft material and motion systems in grade VIII students at SMP N 3 Pulubala. This study aims to obtain student worksheets based on a practical connected type integration model. Teachers and learners can use it easily or practically.

METHOD

This study is a development or R&D research guided by the theory of Borg and Gall, which was rewritten by Sugiyono (2019), which was conducted at SMP Negeri 3 Pulubala Class VIII located in the Village. Bakti, District. Pulubala, Regency. The research time was carried out for 1 month. Research and development is research with the aim of producing products through practicality testing. Consists of 3 validators using product validation

questionnaire. The validation results from the three validators received an average score of 97% with a very valid category. After being declared valid, the product is continued at the practicality test stage.

The instruments used as measuring instruments in this study are: class management sheets, and questionnaire sheets (questionnaires) of student responses. In this study, the data collection method used a Likert scale to test the practicality of the learner worksheet, including classroom management and student responses. The aspects contained in classroom management consist of 13 aspects, namely A1 (Fostering student motivation by presenting perceptions), A2 (Provide opportunities for students to ask questions and get answers), A3 (Conveying topics and learning objectives), A4 (Guiding students to form study groups), A5 (Distributing tools and materials and student worksheets to each group and asking all group members to read student worksheets), A6 (Allowing students to ask and answer questions from students about things that are poorly understood from the observations to be made), A7 (Showing and guiding each group to make observations according to the instructions on the student worksheet), A8 (Asking each group to analyze the results of observations by discussing and then answering questions on the student worksheets), A9 (Allowing each group to present their work), A10 (Together with other groups responding to the results of presentations from the presenting group), A11 (Providing reinforcement from the answers submitted by students), A12 (Together with students to provide conclusions and ask students to summarize the material as an evaluation and give awards to the best group), A13 (Giving awards). In addition, data analysis of the practicality of the student worksheets was used in this study.

RESULTS

Based on the results obtained by testing the practicality of the Integrated Science Student Worksheet based on the connected type integration model on simple aircraft material and human motion systems carried out on grade VIII students of SMP 3 Pulubala, it can be seen that practical data is obtained from class management sheets, student response questionnaire sheets.

Results of classroom management analysis

Classroom management data can be known from observations of situations and interactions that occur in the classroom. These observations are made to understand how classes are run and how students are managed effectively in achieving learning objectives. The assessment of class management in the form of a checklist, can be seen in Figure 1.

Based on Figure 1, the achievement of class management seen from 13 aspects in meeting 1, namely aspects 1, 2, 6, 7, 8, 9, 10, 12 and 13 obtained a score of 100%. This shows a very optimal level of classroom management in the meeting, by paying proper attention to various important aspects. Not only that, aspects 3 and 4 also obtained a score of 88%, which remains included in the excellent category. In aspects 5 and 11, although the score is only 75%, these results are already included in the good category. The second meeting of most aspects such as 1, 2, 4, 7, 8, 9, 10, 11, 12, and 13 achieved a score of 100%. This indicates very effective and well-coordinated class management at the meeting. While aspects 3, 5, and 6 get a score of 88%, it still maintains the excellent category. The third meeting, it can be seen that most aspects, such as 1, 2, 3, 4, 5, 6, 7, 9, 10, 12, and 13

achieved a score of 100%, and aspect 11 obtained a score of 88%, all with excellent categories. Meanwhile, in aspect 8, even though it got a score of 75%, it still obtained a good category. In the fourth meeting, the achievement of class management in aspects 1, 2, 3, 4, 5, 6, 7, 9, 10, and 11 obtained 100% marks, while aspects 8, 12, and 13 received 88% scores, all in the very good category.

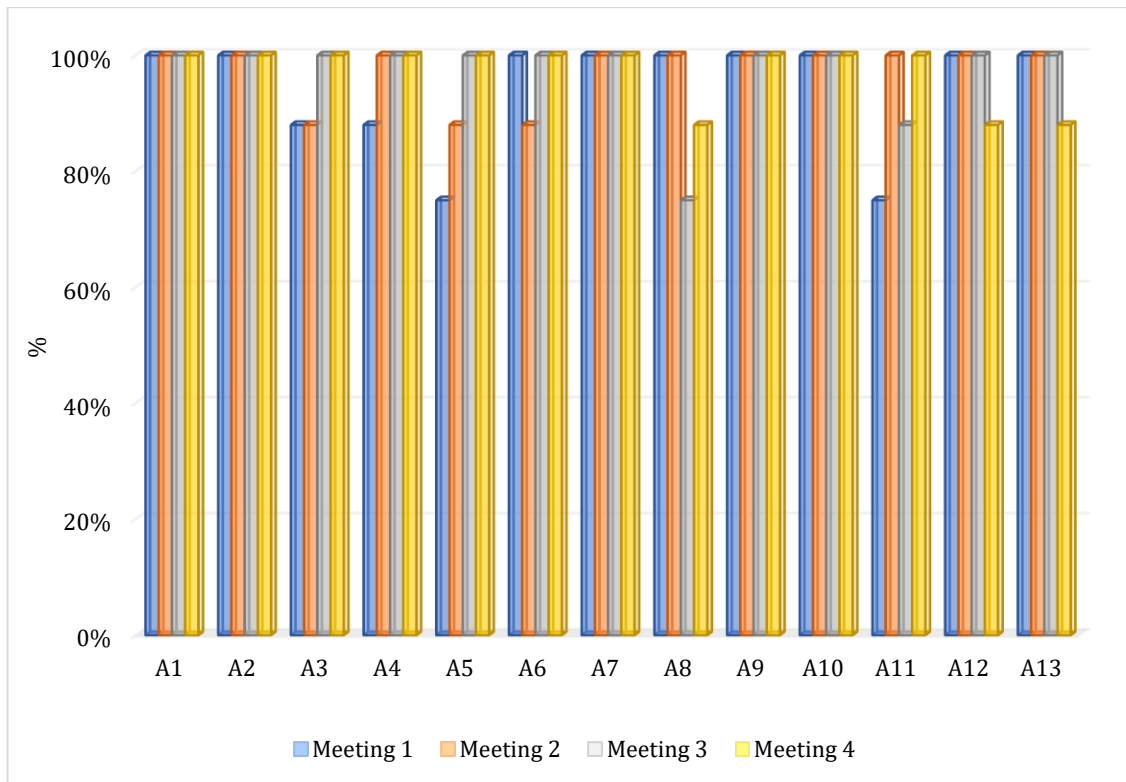


Fig. 1. Class management graph

The achievement of class management from meeting 1 to meeting 4 as a whole received a very good category, although there were certain aspects that in some meetings received scores of 88% and 75%. This shows there is room for improvement in classroom management. Although the score is still in the excellent or good category.

Results of student response analysis

Table 1. Results of Analysis of student response data

No	Indicator	%	Category
1.	Students' opinions about connected learning	64%	Good
2.	Students impressions of connected type integrated learning	66%	Good
3.	The feelings of students during connected type integrated learning	60%	Good
4.	The attention of students during group discussions	67%	Good
5.	Student learning outcomes after participating in learning	60%	Good
Average		63%	Good

The practicality of the 5 indicators obtained values with a range of 61% - 80%. Based on the average results, it is categorized as practical. Based on these average results, it can be concluded that the students' response to the integrated science student worksheet based on the connected type integration model is in the good category.

DISCUSSION

The practicality of student worksheets based on the connected type integration model is seen through class management and student responses. According to Loka (2022), the practicality of student worksheets developed is said to be practical if the student worksheets are easy to use and easy to understand by students in the learning process. Jumalia (2022) that practicality tests are carried out to see whether or not teaching materials are practical when used.

Classroom management

Based on class management conducted using checklist questionnaires on observation sheets, which were observed by 2 observers during 4 meetings, in a limited trial at SMP Negeri 3 Pulubala involving 18 students. The learning process is said to be successful if class management goes well. According to Hasanah (2022), good classroom management by teachers will produce a conducive learning atmosphere, which can increase students' interest in learning and make it easier for students to receive lessons given by their teachers at school. The results of class management carried out in class VIII for 4 meetings get results with an average of 96%, meaning that all learning processes are carried out well, so it can be said that practical learning has a very good category. According to Wiratama (2019), learning tools are said to be practical if the average score percentage is at least in the good category. This is because teachers manage learning in class by creating a comfortable atmosphere so that students feel free to ask questions, talk, and participate. According to Rukhaiyah (2023) to achieve ideal learning conditions, teachers must be able to organize students and teaching suggestions, and create a pleasant learning environment. This is in line with Tanjung's research (2022) managing the classroom is a way to regulate the classroom atmosphere by creating a conducive, pleasant atmosphere and can restore the atmosphere if there is a disruption in the learning process.

There are several stages to achieve good classroom management, namely, the preliminary stage, the author creates an atmosphere to prepare students for learning, is done by providing stimulus through perception, and provides opportunities for students to ask questions and participate in discussions. The stage of the core learning activity, the author guides students in forming groups and distributing student worksheets to each group. The author also allows students to ask questions about things that have not been understood from the observations contained in the student worksheet. After that, the author guides each group in making observations according to the instructions contained in the student worksheet, and students are asked to analyze the results of these observations. The next stage, students are asked to present the results of their group work, and other groups provide responses to the presentation, then students are asked to make conclusions from the learning outcomes. This is in accordance with Mahmudah's

research (2019) the learning process can be realized well if there is interaction between teachers and students, fellow students or with other learning resources. This interaction process is a teaching and learning interaction process.

Student response

The results of responses from students at SMP N 3 Pulubala to integrated student worksheets based on the connected type integration model were obtained through filling out questionnaires after they used student worksheets in learning. According to Talo (2022), and Horota et al. (2023), the student response questionnaire aims to find out how students think about the student worksheets developed. Based on the results of Table 1: indicator 1 (Student opinion about connected type integrated learning) received a response from students, which was 64%, indicator 2 (Student impression of connected type integrated learning) reached 66%, then indicator 3 (Student feelings during connected type integrated learning) obtained a score of 60%, while indicator 4 (students' attention during group discussions) and indicator 5 (students' learning outcomes after participating in learning) get scores of 67% and 60%. The results of the average total score of all indicators on the student response questionnaire obtained 63% with the category "Practical". According to Aldi et al. (2022), practicality criteria are in the range of 61%-80%. Arifuddin (2022) stated that a learning tool developed is said to be practical if the students' responses get an average score that is in the good category.

CONCLUSION

The practicality of developing integrated student worksheets based on the connected type integration model obtained the results of classroom management, namely with an average of 96% and student response questionnaires obtained an average value of 63%. This shows that the worksheets of integrated science students are a practical connected type integration model for use in the learning process.

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