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The effectiveness of the connected type integration model towards student learning outcomes

Rizka Fadila, Frida Maryati Yusuf, Muhammad Yusuf*

Universitas Negeri Gorontalo, Indonesia

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Abstract: This research aims to determine the connected type integration model's effectiveness in improving student learning activities and outcomes. The research sample comprised 19 students in class VIII of SMP Negeri 7 Telaga Biru. Pre-experimental research with a one-group pre-test and post-test design was used in this research. The instruments used in the research were observation sheets and tests. The data analysis used in the research calculated the percentage of activity and n-gain of learning outcomes. The research results showed that students' activities were classified into the "good" and "very good" categories (72%-87%). The analysis results of student learning outcomes obtained an average percentage score for the pre-test of 13 and the post-test of 56. These results prove that there has been an improvement in student activities and learning outcomes. The average n-gain value is 0.5 (medium category). This research concludes that learning based on the connected type integrated learning model in class VIII effectively improves student activities and learning outcomes.

Keywords: Connected learning, integrated science, student performance

Abstrak: Penelitan ini bertujuan untuk mengetahui keefektifan pembelajaran terpadu tipe connected untuk memperbaiki aktivitas dan hasil belajar siswa. Sampel penelitian yang digunakan adalah 19 siswa kelas VIII SMP Negeri 7 Telaga Biru. penelitian pre-eksperimen dengan desain one group pre-test and post-test telah digunakan dalam riset ini. Instrument yang digunakan dalam penelitian adalah lembar observasi dan tes. Teknik analisis data dalam penelitian dengan mengkalkulasi persentase aktivitas dan n-gain hasil belajar. Hasil penelitian menunjukkan bahwa aktivitas peserta didik tergolong kedalam kategori "baik" dan "sangat baik" (72%-87%). Hasil analisis tes hasil belajar peserta didik memperoleh persentase nilai rata-rata pre-test sebesar 13 dan post-test sebesar 56. Hasil tersebut membuktikan bahwa terjadi perbaikan aktivitas dan hasil belajar siswa. Nilai rata-rata n-gain adalah 0.5 (kategori sedang). Kesimpulan dari penelitian ini adalah pembelajaran berbasis model pembelajaran terpadu tipe connected di kelas VIII efektif memperbaiki aktivitas dan hasil belajar siswa.

Kata kunci: Pembelajaran terhubung, IPA terpadu, performa siswa

*Corresponding author: muhammad.yusuf@ung.ac.id

INTRODUCTION

Science classrooms require more 21st-century skills because developing students' problem-solving skills is important (Amadi, 2023). Education is always developing, so teachers and students must have comprehensive abilities to solve future challenges and phenomena (Jannah et al., 2023; Kua et al., 2024). The Indonesian curriculum contains all educational goals through a scientific approach to meet future needs and challenges (Nasir et al., 2020; Uno & Halim, 2021). Natural sciences are learning from real-world situations and more natural situations that encourage students to make connections between parts of natural science (Nasir et al., 2023; Setyantoko et al., 2021).

Integrated science learning is carried out in junior high schools. It provides experience for students to increase their strength to receive, retain, and implement the

concepts they have learned in real-life scenarios (Dita et al., 2023; Sonsun et al., 2023). According to Ansori (2020), Integrated learning is an instructional and learning system encompassing multiple academic disciplines to give students meaningful and purposeful encounters. Asbar and Witarsa (2020) also added that integrated learning is a form of learning that makes students active in exploring and discovering concepts. Integrated learning is presented as a theme by combining concepts from several subjects.

Natural Sciences is one of the subjects contained in the 2013 Curriculum for Junior High School (Sutrisna & Gusnidar, 2022). Natural science is knowledge obtained from collecting experimental data, observation, and deduction to reasonably explain natural phenomena (Susanti & Apriani, 2020). Science is related to efforts to understand various natural phenomena systematically. Science has four dimensions: scientific process, attitude, product, and application (Rahayu et al., 2012). Science contains four things: content or products, attitudes, processes or methods, and technology (Agustina, 2018). According to Astiti et al. (2020), science is a scientific field with the scope of substances and energy, both found in living and non-living things, discussing more about science, such as physics, biology, and chemistry. Integrated science learning has begun to be implemented since the educational unit level curriculum was implemented until the 2013 curriculum. (Ridyah & Siti, 2016).

Based on initial observations and the results of interviews with science teachers at SMP Negeri 7 Telaga Biru, it is known that students need help understanding the material being studied and relating it to other materials in the learning process. The other problem is that the integrated learning model, especially the connected type, has never been implemented at SMP Negeri 7 Telaga Biru. This is because teachers need help finding material to be integrated, there is a lack of examples of making science lesson plans, and there needs to be more references to integrated learning. Apart from that, researchers also discovered that the supporting facilities and infrastructure for integrated learning still need to be fulfilled, and teachers still need to teach at every class level so that learning returns to its original state, namely separately. Using separate learning will take a long time, and there may even be material that has yet to be delivered because the amount of material is not commensurate with the time available.

The integration of science learning can be implemented using a connected-type integration model. According to Majid (2014), the connected type integration model is an integration learning between fields of study. The connected type model is an integrated learning that deliberately attempts to connect one concept with another concept, one theme with another theme, one skill with another skill, and projects carried out in one day with those carried out the next day in one subject (Rusman, 2016). Rahmat (2016) explains that the connected type integration model is an approach to learning that deliberately links several aspects within and between subjects.

Connected learning is the integrated science learning approach that combines various topics, ideas, tasks, and skills (Maruni et al., 2022). In addition, Rahmat (2016) clarified that "connected" learning does not imply bridging several scientific disciplines of study that have commonalities. Each scientific discipline remains in its respective position. "Connected" means connecting material in one scientific discipline. Meanwhile, adding the connected type of integration learning can improve student achievement. In this learning, students can link current topics with previous learning topics (Haidir et al., 2012).

Therefore, using a connected learning model is appropriate for overcoming existing problems. This is because connected learning can combine more than one related material, activating students and making learning meaningful (Sholikhah & Dwi Rochmania, 2023; York, 2023). Connected-type learning is useful for students to see relationships and patterns between various topics. This helps them combine their knowledge more contextually and comprehensively while helping them form views in understanding and responding to science (Fatimah et al., 2023). In addition, the connected learning model stimulates the growth of critical analysis and problem-solving (Fitriatien et al., 2021; Oktari et al., 2023). Students are invited to understand cause-and-effect relationships and identify patterns and skills in scientifically responding to knowledge. Therefore, this research aims to determine the effect of connected type integrated learning on the learning outcomes of class VIII students at SMP Negeri 7 Telaga Biru.

METHOD

This type of research was pre-experimental with a one-group pre-test and post-test design. In this research, before the learning product is used in schools, a product validation test is first carried out by three validators using a product validation questionnaire. Once declared valid, the product continues to the effectiveness testing stage. This research was carried out in Class VIII of SMP Negeri 7 Telaga Biru. The research period took place from June to August 2023. There were 19 students consisting of 8 male and 11 female students.

The instruments used in the research were observation sheets and tests. Before the effectiveness test is carried out, validation is first carried out on the connected type integrated learning implementation plan that will be implemented. The validated aspects include Aspect 1, namely construction; Aspect 2, content; Aspect 3, discussion; and Aspect 4, readability.

The data collection technique in this research tests the effectiveness of student activities and test learning outcomes. The aspects contained in the analysis of student activities consist of 11 aspects, including observing apperception (AA1); Asking, answering, and expressing opinions about observed apperception (AA2); Listening to the teacher's presentation about motivation, topics, and learning objectives (AA3); Forming study groups (AA4); Observe images or videos that have been shared/displayed, and ask or write questions based on the images (AA5); Receive distribution of student worksheets containing learning activities (AA6); Discuss with group friends, write down data and collect data (AA7); Analyze data and combine information according to student worksheet questions (AA8); Presenting the results of group discussions (AA9); Respond to other groups' presentations or answer questions/respond and provide comments (AA10); Concluding the material (AA11). The criteria for assessing student activities are presented in Table 1.

Table 1. Criteria for student activity assessment

Evaluation	Value/Score (%)
Very less	0 – 20
Not enough	21-40
Enough	41-60
Good	61-80
Very good	81-100

The data analysis technique in this research uses the validity and effectiveness of connected type integrated learning through observing student activities and learning outcomes. Analysis of student activities was assessed using a checklist using a scale of 4 (Table 2), and student learning outcomes used n-gain calculations (Table 3).

Table 2. Student activity analysis scores

Evaluation	Score
Very good	4
Good	3
Moderate	2
Not good	1

Table 3. Normalized gain criteria

Gain Score	Category
0,70≤ Gain Score ≤100	High
0,30≤ Gain Score ≤0,70	Medium
0,00≤ Gain Score ≤0,30	Low
Gain Score = 0,00	No increase occurred
-1,00≤ Gain Score ≤0,00	There was a decline

RESULTS AND DISCUSSION

The validation results obtained from the integrated science lesson plan based on Connected type integrated learning for class VIII junior high school students are presented in Figure 1.

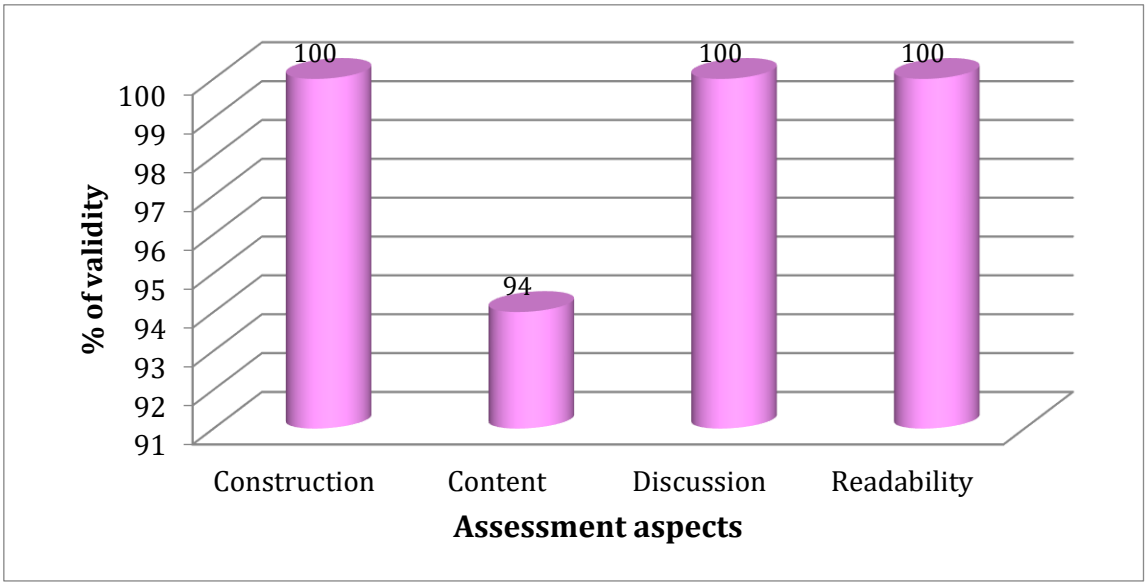

Fig. 1. Graphic of validation results of integrated science lesson plan connected type

Based on Figure 1, it can be seen that the validation results of integrated learning based on the connected type for class VIII junior high school students produced the construction aspect with a validity value of 100%, the content aspect presented received a

validity value of 94%, the discussion aspect received a validity value of 100%. 100%, and the readability aspect gets a validity value of 100%. Based on the validity test results, these four aspects have an average percentage value of 98.5%, included in the feasible criteria. learning tools based on connected type integrated learning that have been validated can be used for learning (Putri et al., 2020)

Data from effectiveness test analysis results were obtained from activity sheets and student learning outcomes tests, which were used to determine the effectiveness of the connected learning. Data from the analysis of student activities was obtained through direct observation in class. Data from the analysis of student activities can be seen in Figure 2.

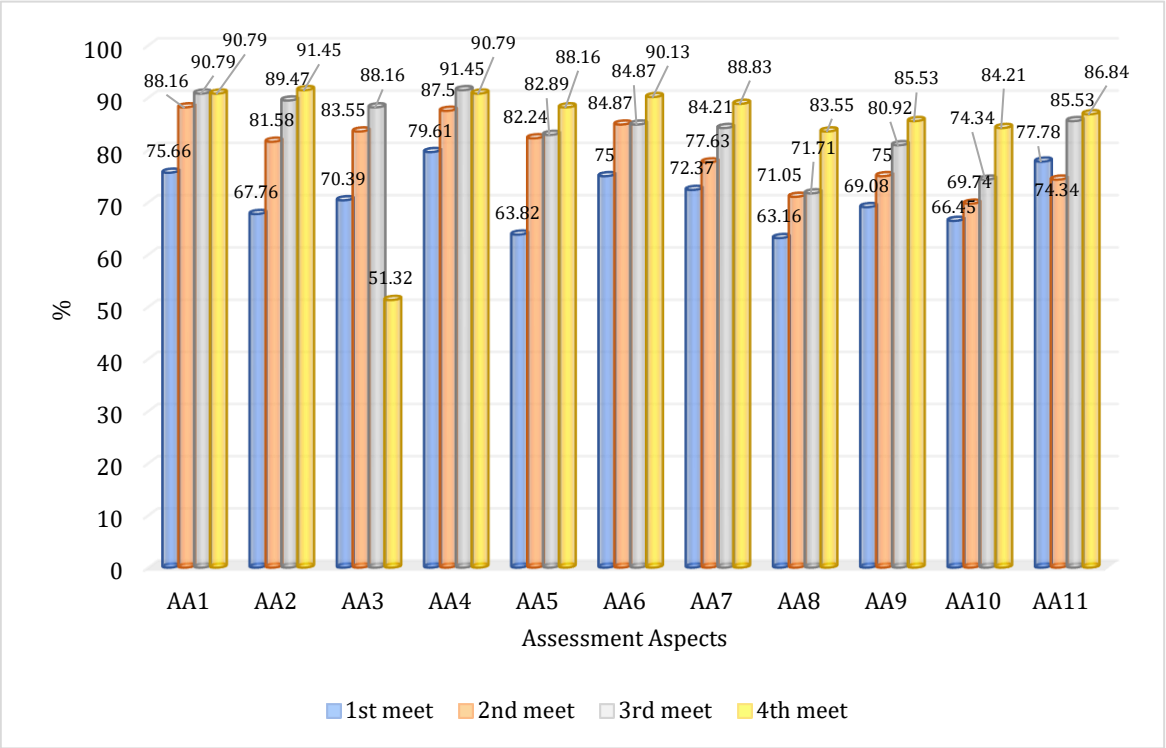

Fig. 2. Graph of student activity analysis results.

Based on Figure 2, the results of the analysis of student activities were obtained through direct observation in class during four meetings. Activities were assessed based on 11 aspects. The results show that the aspects that meet the "good" criteria with a score range of 61% -80% are A3, A5, A8, A9, and A10. Meanwhile, aspects that meet the "very good" criteria with a score range of 81% -100% are A1, A2, A4, A6, A7, and A11.

The advantage of integrated science learning is that children's learning experiences and activities are relevant to their level of development (Wibowo et al., 2021). Activities are selected according to student's interests and needs, and they are meaningful learning activities for children so that the results can last a long time (Ningsih et al., 2017). Minarti et al. (2012) revealed that developing connected type integrated science learning tools can increase junior high school students' learning activities. Apart from that, the research of Muchsen et al. (2016) shows that the science learning process about the human blood circulatory system in implementing connected type integrated science learning can increase students' learning motivation. The increase in student learning activities proves this.

Table 4. Average n-gain of learning outcomes

Students	Average		N-gain Score	Category
	Pre-test	Post-test		
19	13	56	0.5	Moderate

Based on Table 4, it can be seen that the average pre-test score was 13, and the post-test was 56. This shows increased student learning outcomes related to the effectiveness of using connected type integrated learning. The average N-gain value results in a value of 0.5. These results indicate that there is an improve in learning outcomes for students who are included in the medium category.

Based on the assessment of the effectiveness of integrated science learning based on the connected type integration model, this learning effectively improves student activities and learning outcomes. A learning device is said to be effective if it meets the effectiveness criteria (Damopolii et al., 2024). According to Oktamagia et al. (2013), developing connected-type integrated science teaching materials can improve student learning outcomes. Excellent activities during learning indicate that connected-type integration helps students to learn actively. During learning activities, students carry out listening, group discussions, and presentations. Students also ask questions, observe, and provide responses to other groups' presentations. At the end of the learning situation, they are seen drawing conclusions from what they have obtained.

Having good activities improves students' absorption and understanding of science material. A moderate increase in students' knowledge after they learn supports this claim. According to research by Putra et al. (2013), the connected-type integrated model influences students' science learning outcomes. The connected-type integration model in this research has successfully changed student activities and learning outcomes. Learning is an alternative for teachers to support their teaching, especially to bolster student learning outcomes. The learning outcomes in this research are good because the teacher has changed the learning process to be more innovative. Student activities during connected type integrated learning support success in learning (Ibrahim et al., 2023; Taqiya et al., 2019). Connected learning does not make students passive but makes them more active. The final results of this learning have indicated that students can learn well when teachers use the connected-type integration learning model.

CONCLUSION

The conclusion obtained from this research is that the effectiveness of integrated learning of the connected type in class VIII is classified in the "very effective" category for aspects of student activity, where five aspects received "good" criteria and six other aspects received "very good" criteria. Meanwhile, learning outcomes are classified in the "medium" category with an N-Gain value of 0.5. For future researchers, the researcher suggests developing learning based on the connected type integration learning in other science materials.

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