



Practicality of Using Interactive Multimedia Teaching Materials with a STEM Approach in Elementary Schools

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Abstract: The aim of this research is to describe the practicality of interactive multimedia teaching materials in integrated thematic learning using a STEM approach in elementary schools. This type of research is development research using the 4D model (Define, Design, Develop, and Disseminate). Data collection techniques in practicality tests use practicality questionnaires by educators and students. The data in this practicality instrument uses a practicality formula which is analyzed quantitatively. Based on the results of the practicality test, the interactive multimedia teaching materials with the STEM approach that were developed are included in the very practical category with the percentage of practicality test obtained by teachers with an average score of 97%, very practical and the practicality test obtained by students with an average score of 89%, very practical category. It can be concluded that interactive multimedia teaching materials based on the STEM approach meet the criteria for being very practical.

Keywords: Interactive multimedia teaching materials; Practicality; STEM approach

Introduction

The 2013 curriculum at the elementary school level applies integrated thematic learning with a scientific approach. Integrated thematic is learning that combines several other subjects into a theme (Auliyana Sari et al., 2018). Integrated thematic learning is learning that creates meaningful learning experiences by combining several subjects in the form of themes (Fitria, 2019). Integrated thematic learning in the 2013 curriculum, materials, and teaching materials are arranged systematically so that they can be applied to the learning process in class (Weriyaanti et al., 2020). In elementary schools, integrated thematic learning is implemented using teacher books and student books as teaching materials. Teaching materials are used to support learning activities so that the competencies that have been determined can be achieved optimally. Teaching materials are made as interesting and creative as possible by teachers by adapting to students' needs so that they can foster students' interest in learning.

Teaching materials are tools or materials in the form of text that are arranged systematically (Risda Amini et al., 2019). Teaching materials are a program prepared by teachers to develop knowledge, skills, and positive attitudes toward learning which are adapted to the applicable curriculum (Abidin, 2014). In making teaching materials, teachers must pay attention to several aspects, namely the relationship to the curriculum, the characteristics of students, and the student's social environment (Suryaningsih et al., 2020). Without teaching materials, teachers will experience difficulties in carrying out teaching activities so that learning objectives are not achieved optimally. Teaching materials can be developed by teachers based on students' needs. Teaching materials function for teachers and students to help the learning process. Teaching materials developed by teachers must be adapted to current developments that utilize technology. According to Agustina et al. (2022), one type of teaching material that uses technology is multimedia which can be in the form of interactive CDs, computers, and the

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internet. Interactive multimedia also has advantages that can support learning activities so that student learning outcomes can increase (Hakim et al., 2016).

The problem that often occurs in the field is that teachers are not able to determine the right teaching materials in the learning process, the tendency for the teaching materials used is still to focus on books (Aisyah et al., 2020). In fact, teachers should not only rely on teacher books and student books in teaching material during learning activities (Nasrul, 2018). Based on the results of a preliminary study conducted at SDN 229/VI Sungai Manau IV, a problem was found, namely that the completeness of learning equipment in schools was still minimal so to support the learning process was still limited, teachers only used package books from the government in the form of teacher's books and student's books, the minimum teaching materials that vary in learning activities and no additional teaching materials are used. Teachers never use technology to create interesting teaching materials. From the results of the researcher's interviews with students, it is known that in learning activities students often feel bored because learning activities are considered monotonous and less interesting. Monotonous learning will have a bad impact on students because if students feel bored or not interested in learning activities, students will become increasingly lazy and unfocused during learning activities. This will have an impact on student learning outcomes. Learning that is less than optimal will cause the learning outcomes obtained by students to be less than optimal.

Based on the problems above, they should be addressed immediately because teaching materials are a very important learning tool. Therefore, teachers are required to be able to provide innovation and creativity in developing teaching materials. Teachers must develop teaching materials by utilizing current technology such as interactive multimedia. Interactive multimedia is a computer program in the form of digital content containing audio, video, images, and reading that forms an integrated whole (Sudarma et al., 2015). The use of interactive media aims to facilitate the learning process and increase creativity and innovation for teachers in designing communicative and interactive learning (Daryanto, 2014). Apart from that, the learning approach also has an important influence on the learning process. One approach that can support learning by utilizing technology is the STEM approach.

STEM is an abbreviation for Science, Technology, Engineering and Mathematics. STEM is a multidisciplinary approach to science that becomes a complete learning approach. The integration of multidisciplinary sciences into one unit is expected to produce mastery of concepts, one of which is science process skills and can apply them in life (Mahjatia et al.,

2021). The STEM approach aims to solve daily life problems by applying it in schools where the subject of learning is by combining the knowledge, skills, and attitudes possessed by students (Silvia et al., 2020).

An alternative solution that can be provided is by using interactive multimedia teaching materials based on a STEM approach. With this interactive multimedia teaching material, it can support learning activities in accordance with the current 21st century. The reason the author chose interactive multimedia teaching materials based on a STEM approach as a solution to solving problems that occur is that these interactive multimedia teaching materials can be in the form of video, audio, or audio visual. Students can learn according to their respective learning styles. This teaching material can be used by teachers and students offline. This is in accordance with previous research that has been carried out by several researchers, including research entitled "Development of Interactive Multimedia-Based Thematic DELIKA Teaching Materials for Elementary School Students in Kediri City" by Mukmin et al. (2018) which states that the use of interactive multimedia teaching materials can improve student learning outcomes. Therefore, the author is interested in conducting this research which aims to analyze the practicality of using interactive multimedia teaching materials based on a STEM approach in elementary schools.

Method

This research is development research or R&D (Research and Development) (Suryaningsih et al., 2020). Development research is a research method used to develop new products (Sugiyono, 2015). The product developed in this research is interactive multimedia teaching materials based on the STEAM approach in elementary schools. Based on the background of the problem in this research, the development model that is suitable to use is 4D (Define, Design, Develop, and Disseminate). Silvasailam Thirigarajan, Dorothy S. Semmel, and Melvin I. Semmel developed the 4-D development model in 1974 (Safitri et al., 2019). This model can be used to solve learning problems so that students' needs can be met (Hadiyanti, 2021). This development model consists of four stages, namely definition, design, development, and dissemination. In this research, it was carried out in the development stage, namely at the practicality test stage. Practicality is used to measure how practical the interactive multimedia teaching materials that have been created are. The level of practicality of interactive multimedia-based teaching materials based on the STEM approach can be seen from their use by teachers and students. Questionnaires were given to teachers and students to

see the practicality of the materials interactive multimedia teaching from the aspects of ease in operating interactive multimedia teaching materials, time efficiency, attractiveness in using interactive multimedia teaching materials, ease in understanding learning materials, and equivalence of teaching materials.

The subjects in this research were class III students at SDN 229/VI Sungai Manau IV and SDN 156/VI Durian Batakuk. The data collection technique in this research uses a questionnaire from teacher responses and student responses. The instruments used were teacher response questionnaire sheets and student responses. The data analysis technique is by using quantitative analysis with a practical formula, namely:

$$\text{Practicality} = \frac{\text{score obtained}}{\text{maximum score}} \times 100 \% \quad (1)$$

Based on the percentage of practicality results obtained, they are then categorized according to the level of practicality as follows:

Table 1. Practicality Level Criteria

Level of Practicality	Category
81-100	Very practical
61-80	Practical
41-60	Quite practical
21-40	Less practical
0-20	Not practical

Results and Discussion

After developing interactive multimedia teaching material products, the next stage is to carry out product practicality trials. Practicality trials are carried out with the aim of seeing the practicality of the teaching materials used. To see the practicality, a questionnaire was used in the form of teacher responses and a student response questionnaire. The trial was carried out on 1 teacher and 15 students at SDN 229/VI Sungai Manau IV and 1 teacher and 11 students at SDN 156/VI Durian Batakuk.

Practical Test Results for Teachers

Practicality trial data for interactive multimedia teaching materials based on the STEM approach were obtained from primary data obtained directly from class III teachers at SDN 229/VI Sungai Manau IV and class III teachers at SDN 156/VI Durian Batakuk. The practicality test for grade III elementary school teachers provides an assessment of the practicality of using teaching materials, which are divided into 7 indicators on a questionnaire sheet that has been provided previously. The results of the teacher trials were carried out on 2 teachers from different schools.

Table 2. Practical Test Results for Teachers

School	Score
SDN 229/VI Sungai Manau IV	96
SDN 156/VI Durian Batakuk	98
Average practicality by teachers	97%
Category	Very practical

The results of the analysis of teachers' responses to the practicality of interactive multimedia teaching materials based on the STEM approach above are the results of responses from class III teachers who carried out product trials using interactive multimedia teaching materials. Based on the data in table 2, it can be concluded that the results of the trial on 2 teachers from different schools with an average score of 97% were in the very practical category. The results of the teacher questionnaire analysis show that teachers find it easy to operate interactive multimedia teaching materials, the learning time corresponds to the time of application of interactive multimedia teaching materials, learning can be repeated according to the user, can foster student interest and creativity, and is very appropriate to the student's characteristics. This shows that the interactive multimedia teaching materials based on the STEM approach that have been developed are very practical to use and easy to operate independently and are suitable for use in the learning process in class III of elementary schools.

From the data on the practicality of using interactive multimedia teaching materials in the aspect of teacher responses, the result was that teachers liked the use of interactive multimedia teaching materials because none of the teaching materials in schools used interactive multimedia. In this interactive multimedia teaching material, students only need to carry out assignments according to the steps contained in the interactive multimedia teaching material so that here the teacher acts as a facilitator and learning is two-way. The teacher no longer functions as a learning center but as a director and motivator for students to learn.

The results of interviews conducted with class III teachers explained that during the learning process using interactive multimedia teaching materials very significant changes occurred. When learning, students focus more on paying attention to the teaching materials used because there is not only text but also audio, video, and audiovisual. Apart from that, students also easily understand learning material about animal growth, have high interest and motivation in learning, students are more easily conditioned when learning takes place.

Results of Practical Trials with Students

Student responses regarding the practicality of using interactive multimedia teaching material products are used to assess the practicality of the teaching

materials used. Practical data collection was carried out using a questionnaire that was given to students after the use of interactive multimedia teaching materials was implemented in the learning process. The results of student trials were carried out on 15 students at SDN 229/VI Sungai Manau IV and 11 students at SDN 156/VI Durian Batakuk.

Table 3. Results of Practical Trials with Students

School	Score
SDN 229/VI Sungai Manau IV	90
SDN 156/VI Durian Batakuk	88
Average practicality by teachers	89%
Category	Very practical

From Table 3 above, it can be explained that the general results of students feel motivated and helped in understanding the material contained in interactive multimedia teaching materials based on a STEM approach. Apart from that, students also find it easy to operate interactive multimedia teaching materials. The results of the practicality test for the student aspect show that the level of practicality of interactive multimedia teaching materials is very practical, namely with an average score of 89% from 2 different schools. Furthermore, students also have new experiences with teaching materials that are different from the teaching materials they have used before so that learning is not monotonous and boring.

The results of the level of practicality of interactive multimedia teaching materials obtained from the teacher response questionnaire and student responses are presented in the form of the following diagram:

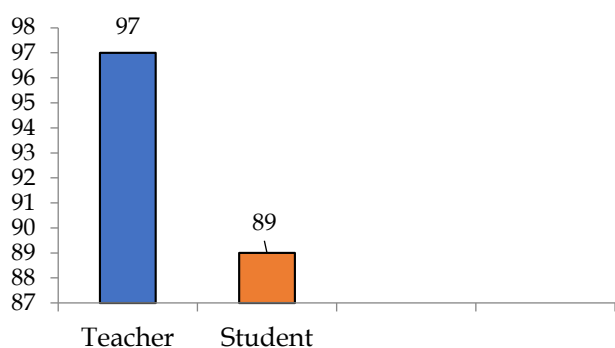


Figure 1. Practicality of interactive multimedia teaching materials

The diagram above shows the practical value of interactive multimedia teaching materials from the teacher and student aspects. Based on the results of practicality by teachers, an average of 97% was obtained in the Very Practical category. The practicality results for students obtained a practicality score of 89% in the Very

Practical category. The practicality of this multimedia-based teaching material is seen from the perspective of ease of use for learning. This shows that interactive multimedia-based teaching materials are simple and do not require extraordinary abilities to use them. Interactive multimedia-based teaching materials are also equipped with instructions for use so that teachers and students know the methods used to use teaching materials. The existence of interactive multimedia teaching materials can help teachers in the learning process according to the characteristics of different students. Teachers can use interactive multimedia according to students' learning styles, such as students who like to read, hear, or see. Therefore, teachers play an important role in preparing teaching materials that suit students' needs to achieve learning goals optimally.

Conclusion

Based on the problem formulation, objectives and discussion regarding the practicality of interactive multimedia teaching materials based on the STEM approach, it can be concluded that these teaching materials were developed using 4D development design. The development of interactive multimedia teaching materials with a STEM approach in elementary schools is stated to be very practical with the practicality percentage of trials carried out by teachers being 97% in the very practical category. Apart from that, trials with students received an average score of 89% in the very practical category. Based on the practical analysis, it can be seen that teachers and students can easily operate this interactive multimedia teaching material, students can easily understand the learning material being taught, class conditions become conducive, students' interest and creativity increase students become focused and learning becomes less monotonous. So it can be concluded that interactive multimedia teaching materials with a STEM approach are very practical and can be used in the thematic learning process in class III of elementary schools.

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Conflicts of Interests

The authors declare no conflict of interest.

References

- Abidin, Y. (2014). *Desain Sistem Pembelajaran dalam Konteks Kurikulum 2013*. PT Refika Aditama.
- Agustina, Y., & Desyandri, D. (2022). Pengembangan Bahan Ajar Multimedia Interaktif Macromedia Flash 8 Berbasis Pendekatan Steam Pada Pembelajaran Tematik Terpadu Di Sekolah Dasar. *VOX EDUKASI: Jurnal Ilmiah Ilmu Pendidikan*, 13(2), 294-308. Retrieved from <http://jurnal.stkipppersada.ac.id/jurnal/index.php/VOX/article/view/1826>
- Aisyah, S., Noviyanti, E., & Triyanto, T. (2020). Bahan Ajar Sebagai Bagian Dalam Kajian Problematika Pembelajaran Bahasa Indonesia. *Jurnal Salaka: Jurnal Bahasa, Sastra, Dan Budaya Indonesia*, 2(1). <https://doi.org/10.33751/jsalaka.v2i1.1838>
- Auliyana Sari, N., & Akbar, dun. (2018). Penerapan Pembelajaran Tematik Terpadu di Sekolah Dasar. *Jurnal Pendidikan*, 3(12), 1572-1582. Retrieved from <http://journal.um.ac.id/index.php/jptpp/>
- Daryanto, D. (2014). *Penelitian Tindakan Kelas dan Penelitian Tindakan Sekolah*. CV Gava Media.
- Fitria, Y. (2019). *Landasan Pembelajaran Sains Terintegrasi (Terpadu) untuk Level Dasar*. Padang. Sukabina Press.
- Hadiyanti, A. H. D. (2021). Pengembangan Media Kartu Permainan IPA untuk Perkuliahan IPA Biologi. *Edukatif: Jurnal Ilmu Pendidikan*, 3(6), 4356-4362. <https://doi.org/10.31004/edukatif.v3i6.1336>
- Hakim, A. R., & Windayana, H. (2016). Pengaruh Penggunaan Multimedia Interaktif Dalam Pembelajaran Matematika Untuk Meningkatkan Hasil Belajar Siswa SD. *EduHumaniora | Jurnal Pendidikan Dasar Kampus Cibiru*, 4(2). <https://doi.org/10.17509/eh.v4i2.2827>
- Mahjatia, N., Susilowati, E., & Miriam, S. (2021). Pengembangan LKPD Berbasis STEM untuk Melatihkan Keterampilan Proses Sains Siswa Melalui Inkuiri Terbimbing. *Jurnal Ilmiah Pendidikan Fisika*, 4(3), 139. <https://doi.org/10.20527/jipf.v4i3.2055>
- Mukmin, B. A., & Zunaidah, F. N. (2018). Pengembangan Bahan Ajar DELIKAN Tematik Berbasis Multimedia Interaktif Untuk Siswa Sekolah Dasar di Kota Kediri. *Al Ibtida: Jurnal Pendidikan Guru MI*, 5(2), 145. <https://doi.org/10.24235/al.ibtida.snj.v5i2.2788>
- Nasrul, S. (2018). Pengembangan Bahan Ajar Tematik Terpadu Berbasis Model Problem Based Learning Di Kelas Iv Sekolah Dasar. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar*, 2(1), 81-92. <https://doi.org/10.24036/jippsd.v2i1.100491>
- Risda Amini, R., Amini, R., Eka Handayani, S., Fitria, Y., May Lena, S., & Helsa, Y. (2019). Development of Integrated Thematic Teaching Materials using Problem-Based Learning Model in Elementary School. *Proceedings of the 5th International Conference on Education and Technology (ICET 2019)*, 382. <https://doi.org/10.2991/icet-19.2019.111>
- Safitri, A. K. D., & Nuhgraha, J. (2019). Pengembangan Media Pembelajaran Interaktif Berbantuan Adobe Flash CS5 pada Kompetensi Dasar Menganalisis Jabatan, Tugas, dan Uraian Pekerjaan Kelas X OTKP 5 di SMK Ketintang Surabaya. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, 7(3), 51-59. Retrieved from <https://jurnalmahasiswa.unesa.ac.id/index.php/JPAPUNESA/article/view/29510/27032>
- Silvia, A., & Simatupang, H. (2020). Pengembangan LKPD Berbasis Science, Technology, Engineering, and Mathematics Untuk Menumbuhkan Keterampilan Literasi Sains Siswa Kelas X MIA SMA NEGERI 14 Medan T.P 2019/2020. *BEST Journal (Biology Education, Sains and Technology)*, 3(1), 39-44. <https://doi.org/10.30743/best.v3i1.2434>
- Sudarma, I. K., Prabawa, D. G. A. P., & Tegeh, I. M. (2015). *Desain Pesan: Kajian Analisis Desain Visual Teks dan Image*. Yogyakarta: Graha ilmu.
- Sugiyono. (2015). *Meode Penelitian & Pengembangan: Research and Development*. Bandung: Alfabeta.
- Suryaningsih, Y., Gaffar, A. A., & Sugandi, M. K. (2020). Pengembangan Media Pembelajaran Praktikum Virtual Berbasis Android Untuk Meningkatkan Berpikir Kreatif Siswa. *BIO EDUCATIO: (The Journal of Science and Biology Education)*, 5(1), 1127-1133. <https://doi.org/10.31949/be.v5i1.2243>
- Weriyaniti, W., Firman, F., Taufina, T., Taufina, T., & Zikri, A. (2020). Pengembangan Bahan Ajar Tematik Terpadu dengan Strategi Question Student Have di Sekolah Dasar. *Jurnal Basicedu*, 4(2), 476-483. <https://doi.org/10.31004/basicedu.v4i2.374>