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Needs Analysis for the Development of Snowball Throwing Based Multimedia on Science Learning for Middle School

Elvy Kartika Putri^{*}, Nur Islami², Neni Hermita³

^{1 2 3} University of Riau Postgraduate Programmes, Pekanbaru, 28293, Indonesia

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ABSTRACT

This research is motivated by students' struggles in understanding some abstract science concepts and their lack of active involvement in the learning process to develop their thinking skills. Abstract science concepts and student involvement can be achieved through interesting multimedia communication tools. This research is survey research that serves as an initial step in the development of snowball throwing based multimedia. the purpose of this study is to determine what students currently need in science learning and how much students need for the development of snowball throwing based multimedia. the research subjects were junior high school students with a total sample of 72 students and 27 science MGMP (Teacher Forum) teachers selected based on region. The study's analysis consisted of four indicators: analysis of learning problems, analysis of learning objectives, analysis of students, and analysis of learning settings. According to the study's result, the information obtained was that the development of snowball throwing based multimedia needed to be developed as a science learning media.

1. Introduction

Education is considered a measure of a nation's growth. According to the Law on the National Education System number 20 of 2003, national education aims to develop students' potential to become human beings who have faith and fear of God Almighty, noble character, healthy, knowledgeable, capable, creative, independent, and responsible. Improving the quality of education is a commitment to improving the quality of human resources as capital for nation building and efforts to achieve educational goals (Dadi, et al, 2019).

The quality of science education in Indonesia compared to other countries is still relatively low. In 2015, the result of the Trends in International Mathematics and Science Study (TIMSS) achievement report that Indonesia was placed 44th out of

* Corresponding author.
E-mail: elvy.kartika6979@grad.unri.ac.id

49 countries with a score of 397 (Hadi & Novaliyosi, 2019). Furthermore, Indonesia's Program for International Student Assessment (PISA) score in 2018 was ranked 71 out of 79 countries with a score of 396 (OECD, 2019). It shows that the quality of science education in Indonesia remains relatively low and is a serious problem. The quality of education determines the learning process, one of which is learning Natural Sciences (IPA) (Syofyan dan Ismail, 2018).

Science is a collection of knowledge on natural phenomena that is structured systematically, including facts, concepts, and laws that have been verified through a series of research (Juniati & Jamaluddin, 2020). The fact that science involves some abstract concepts makes it less desirable and considers a difficult subject for students (Maison, et al, 2019). Student's difficulties in understanding abstract concepts can hinder student learning success (Dinatha & Laksana, 2017). Students' active involvement in learning also influences learning success (Fredricks, et al, 2016). In line with the opinion of Dewi, et al (2020) that an essential aspect of learning science is that students must be actively involved and develop their thinking skills in learning activities.

One effort to visualize abstract concepts and involve students actively in learning activities is to present more innovative learning media. According to Pangestu, et al (2018), innovative and creative teachers must be able to develop and use learning media that are in step with advancements in science and technology. Learning media is a tool to convey messages to create more effective and efficient learning environment conditions (Ariani & Festiyed, 2019). One of the learning media that teachers may use to visualize abstract science concepts and can involve students actively in constructing their knowledge in learning is multimedia (Rusli, et al, 2017).

Multimedia is a comprehensive information technology that processes and controls information in the form of text, images, graphics, sound, animation, and video (Tien, et al, 2018). Animations and videos in multimedia can visualize abstract material into concrete to facilitate students understand the material better because it also involves various senses making it easier for students to absorb the subject matter (Rusli, 2017). Multimedia is often used to enhance teaching and learning (Ibrahim, et al, 2021).

Multimedia can improve mastery of subject matter as a whole, develop the ability to interact directly with the environment, and be used as an ICT based learning resource that allows students to learn independently based on their abilities and interests (Wardani, et al, 2019). Multimedia can also demonstrate tiny, large, and dangerous objects that students cannot immediately discover, so multimedia can present abstract explanations (Parata & Zawawi, 2018). The advantage of using multimedia is that it attracts students since learning becomes more concrete, interesting, and less boring (Novianto, et al, 2018).

Moreover, various learning models may be used to train students to participate actively in the science learning process. There are several cooperative learning models, one of which is the snowball throwing model. The snowball throwing

model is a learning model that introduces students to specific knowledge and facts that have been taught to them and confronts them with many problems that must be solved together to obtain complete similarities (Mulyani, et al, 2022).

The snowball throwing model is a cooperative learning model that encourages students to be active in learning (Manula, 2022). It also provides opportunities for students to develop their thinking skills and make learning becomes effective. In addition, throwing question balls makes the group dynamic because students engage in more than thinking, writing, asking, and talking but also doing physical activities such as rolling paper and throwing it at other students (Purdiyanto, et al, 2022).

Based on the advantages and success of using multimedia as a learning medium and the importance of learning models, students can understand abstract concepts and may actively involve in developing thinking skills in the learning process. Therefore, snowball throwing based multimedia needs to be developed in science learning. However, an initial analysis must be performed first to assess the multimedia needs. Needs assessment to develop a learning media is crucial since it will help obtain learning media that is appropriate to the student's situation and characteristics. Needs analysis can be carried out if the learning program designer can perform a series of analyzes on the needs of students and teachers. The analysis of these needs includes an analysis of learning problems, an analysis of learning objectives, an analysis of students, analysis of learning settings (Tegeh, 2014).

2. Methodology

This type of research is survey research conducted by collecting information or data directly from the research subjects. The sampling technique applied was cluster sampling involving 72 junior high school students and 27 science MGMP teachers in a certain region. The sampling was taken based on a predetermined population region to determine which population is used as a data source. The research flow chart can be seen in Figure 1.

In this survey, the instrument used was a closed ended questionnaire, which was developed based on indicators of learning needs analysis. The developed questionnaire based on four indicators consists of 16 questions for students and 18 for teachers. The amount of items for each student and teacher questionnaire indicator is shown in Table 1.

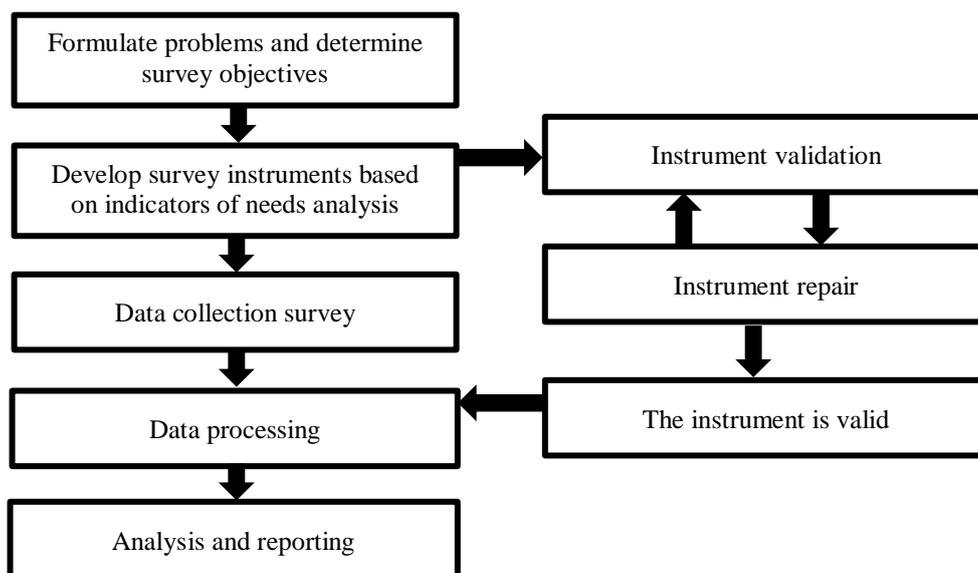


Figure 1. Research Flow

Table 1. Indicators of Need Analysis Questionnaire for Teachers and Students

Indicators of Needs Analysis	Number of Questions Items (Students)	Number of Questions Items (Teachers)
Analysis of learning problems	11	9
Analysis of learning objectives	1	1
Analysis on students	3	6
Analysis of learning settings	1	2

Source: Tegeh, et al, 2014

The four options for the question items in Table 1 were a score of strongly agreeing 4, a score of agreeing 3, a score of disagreeing 2, and a score of strongly disagreeing 1. Before the questionnaire was distributed to students and teachers, two science experts performed construct validation. If the two science experts have stated that the instrument is valid, then the instrument can be used for surveys. After After being assessed by the two validators, the results were then analyzed using descriptive statistics to obtain the average score of the indicators. Determining the level of need for snowball throwing-based multimedia development in science learning for each category can be seen in Table 2.

Table 2. Analysis of Need Categories

No	Range Average Score	Categories	Decision
1	>3,25 – 4	Very High	Need
2	>2,5 - ≤3,25	High	Need
3	>1,75 - ≤2,5	Low	No need
4	1 - ≤1,75	Very Low	No need

Source: Afni dan Kazmi, 2019

3. Results and Discussion

For the learning process to run properly, needs analysis in learning that must be met are an analysis of learning problems, an analysis of learning objectives, an analysis of students, and an analysis of learning settings. Based on the four learning needs analyses, the level of need for developing multimedia based on snowball throwing in learning can be analyzed so that it can be a solution to meet the needs of science learning.

Then data analysis performed in this research yielded information regarding students' needs for snowball throwing based multimedia for each needs analysis indicator. The results of data processing are shown in Figure 2.

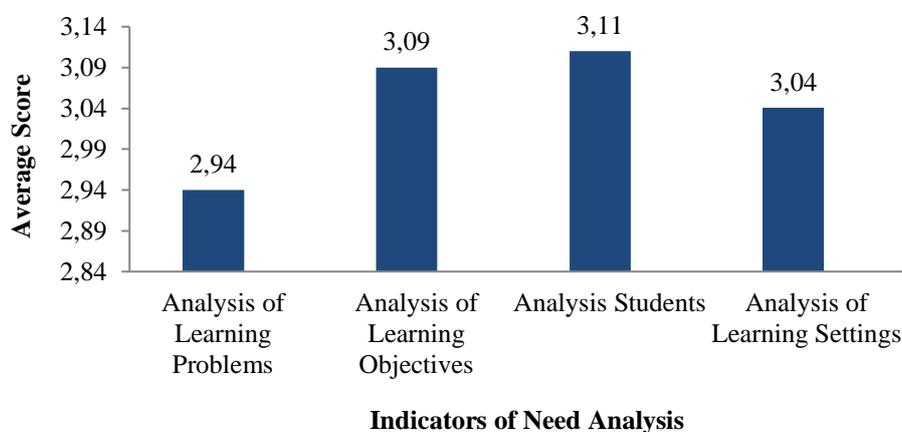


Figure 2. Results of Students' Needs Analysis for Multimedia

Problem solving in learning is a form of learning need. As stated by Asrizal, et al (2017) it is important to solve learning problems to ensure no gaps in the learning process. Figure 2 illustrates that the learning problem analysis indicator scored 2.94, indicating that students agree with the presented statements.

One of the statements agreed upon by the students in the analysis of the learning problems is that science learning involves little more than observing, reading, and taking notes on the material given by the teacher, which is boring for students. Meanwhile, students want to actively participate in learning since they find it tedious to simply listen and write (Syukraini and Advinda, 2020). Students also agree with the statement that students feel not interested in learning that consists of only theoretical explanations without any activities carried out. Some students feel happy to answer questions that are solved together during group discussions to exchange information and solve problems (Prihatini, 2017).

Besides, learning media affect students' motivation to learn. This can be seen in the item statement that states students are interested in the learning process while using learning media that presents text, images, animation, audio, and video such as multimedia. In light of this, Kurniawati, et al (2019) stated that multimedia helps students learn, boosts their motivation, and influences student skills. According to

Sholihah, et al (2020), Parata & Zawawi (2018), and Khoiriah, et al (2016), multimedia can improve students' cognitive abilities. It is because multimedia can simplify and visualize material more effectively (Rosalina dan Suhardi, 2020).

Furthermore, the analysis of learning objectives is the behavior of learning outcomes that students are expected to have and master after learning. Figure 2 shows the analysis of the learning objectives indicator and obtains a score of 3.09, meaning that students agree with the statements given. One of the statements states that students feel that science learning related to technological developments can bring up more curiosity about the subject matter. Technology develops students' thinking skills and fosters a dynamic learning atmosphere to build curiosity during the learning process (Purfitasari, dkk, 2019).

The student analysis comes next. This analysis is essential in learning to realize the goals of learning science, it is necessary to analyze the learning components that are appropriate for students so that students play a role in learning and have abilities that are following these learning objectives. Learning that prioritizes the role of students to take their initiative and active involvement in learning activities (Pohan, 2014). One of the statements is that if the teacher provides learning media in the form of text, animation, video, audio, and video, students feel they are doing activities in learning.

In addition to using multimedia, learning must also develop students who are used to working together to solve problems to train students' cognitive abilities. The student's cognitive abilities can improve if students are actively involved in the learning process (Lestati & Irwandi, 2019). This is in line with the statement that learning involving collaboration between one student and another can broaden knowledge. Students also agree with the activity of responding and solving problems about the material that makes students ready for learning. The average score of these statements is 3.11, which is in the range of scores $> 2.5 \leq 3.25$, meaning that students agree that multimedia can meet students' needs analysis so they can understand better.

The final analysis is the analysis of learning settings. Based on Figure 2, it can be seen that the average score is 3.04, which indicates that students agree with the statement on multimedia development. The statement that the students agree upon is that using a learning model allows them to discuss seeking information, making students more motivated and challenged in learning. This statement is relevant to the 2013 curriculum learning, which emphasizes the use of interactive, inspiring, fun learning models, motivating students to seek information actively (Permendikbud, 2018).

The results of data analysis on 27 MGMP science teachers can be seen as shown in Figure 3.

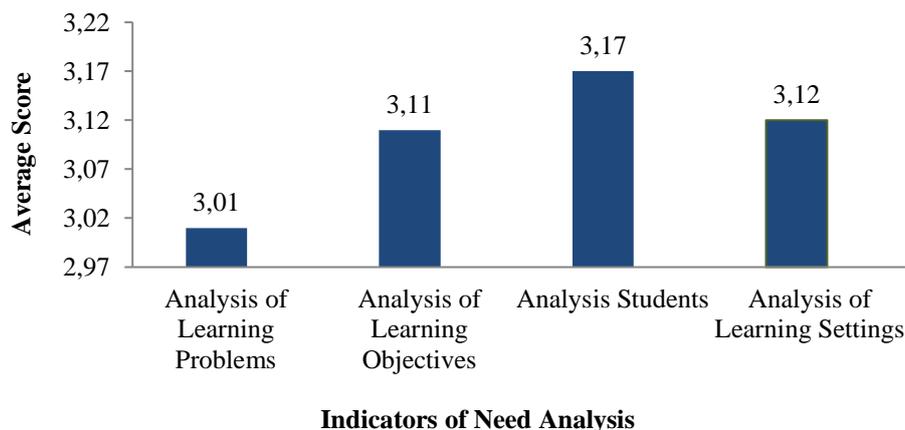


Figure 3. Results of Teachers' Needs Analysis for Multimedia

Figure 3 illustrates that the level of teacher needs for snowball throwing based multimedia is in the range of an average score of 2.97-3.22, meaning that the teacher agrees with the statements described in the multimedia needs questionnaire items distributed. It proves the high level of need for multimedia development based on the learning needs analysis. Teachers are one of the influential components in learning, and they are required to have the ability to improve the quality of education (Buchari, 2018). Teachers must be smart and creative in finding solutions to various obstacles encountered so that they affect students' ability to improve (Insani, 2016).

Figure 3 shows that the analysis results of the indicators of learning problems obtain an average score of 3.0 in the score range $> 2.5 - \leq 3.25$, indicating that one of the indicator items of learning problems is that students are not interested in learning that does not involve their participation. Since teachers respond positively to this statement, student centered learning must be developed. Khodir (2018) stated that learning must be student centered, which places students as individuals who can develop according to their abilities. Science learning not only transfers knowledge but also builds a process of discovery that involves the active role of students.

The teacher also agrees with the statement that it is necessary for science learning activities to enable students to argue in expressing ideas both orally and in writing. Then, the teacher also agrees with learning that involves active students to make students motivated, skilled, and understand the material. Students' active involvement in conveying ideas verbally and in writing can be improved by using the snowball throwing learning model. According to Dewi, et al (2020), this learning model can train students' thinking skills as outlined in written questions and when students answer the questions they get. It means that motivating students to think and be active in learning can have a positive impact on student achievement.

Based on the teachers' point of view, students feel motivated and interested when learning uses multimedia. Multimedia is learning media in the form of text,

images, animation, audio, and video, which involve students' active role in the learning process. According to Rante, et al (2013), multimedia encourages students to be creative, improves their ability to understand the material, and constructs knowledge actively and with fun. Students' active activities have an impact on improving student's cognitive abilities (Manula, et al, 2022).

On the other hand, the analysis of learning objectives indicators obtains a score of 3.11 with a score range of $> 2.5 \leq 3.25$, meaning that the teacher agrees with the statements on the items described in the questionnaire. One of the statement items is that the teacher agrees that science learning is related to technological developments, so it creates students' curiosity about the material. Following KI 3 of knowledge competencies, students understand knowledge (factual, conceptual, procedural) based on curiosity about science and technology (Permendikbud, 2016).

The following indicator analysis is an analysis of students. This analysis aims to determine the problems faced by students in the learning process from the teachers' perspectives. One form of learning problem is prioritizing the role of students in interacting with each other (Pohan, 2014). It is strengthened by the average score of 3.17 obtained through the analysis of learning problems. This score indicated that the teacher agrees with learning statements involving cooperation between one student and another to broaden students' knowledge and make it easier for them to understand the material.

The final analysis is the analysis of learning settings with an average score of 3.12 in the score range $> 2.5 \leq 3.25$ in the high category and the need for improvement in science learning settings. The implementation of the 2013 curriculum learning emphasizes using interactive, inspiring, fun, and challenging learning models that motivate students to seek information actively (Permendikbud, 2018).

The snowball throwing model allows students to develop their thinking skills by allowing them to make questions and give them to other students (Mulyani, et al, 2022). However, applying a learning model that requires students to create and answer questions while exploring their potential might be challenging. The teacher responds positively to this statement, which states that the teacher still struggles in presenting digital media that encourages students to actively seek information, ask questions, and express their opinions in learning. Therefore, the solution provided is to develop multimedia using the snowball throwing model. Multimedia is essential to create to make students the center of learning (Rahmat, 2015). According to the analysis of students and teachers as a whole, students and teachers need snowball throwing based multimedia for science learning.

4. Conclusion

Needs analysis for developing snowball throwing based multimedia is based on four indicators: analysis of learning problems, analysis of learning objectives, analysis of students, and analysis of learning settings. Based on the overall

analysis of these four indicators, it can be concluded that the development of snowball throwing based multimedia is needed for students and teachers in science learning.

References

- Afni, N., & Kazmi, T. (2019). The Need Analysis Developing STEM Embedded Project. *Proceeding of the SS9 and 3rd URICES*. Pekanbaru, Indonesia. 569-576.
- Ariani, R., & Festiyed. (2019). Analisis Landasan Ilmu Pengetahuan dan Teknologi Pendidikan dalam Pengembangan Multimedia Interaktif. *Jurnal Penelitian Pembelajaran Fisika*, 5(2), 155-162.
- Asrizal, Festiyed, & Sumarmin, R. (2017). Analisis Kebutuhan Pengembangan Bahan Ajar IPA Terpadu Bermuatan Literasi Era Digital Untuk Pembelajaran Siswa SMP Kelas VIII. *Jurnal Eksakta Pendidikan (JEP)*, 1(1), 1-8.
- Buchari, A. (2018). Peran Guru Dalam Pengelolaan Pembelajaran. *Jurnal Ilmiah Iqra'*, 12(2), 106-124.
- Dadi, I. K., Redhana, I. W., & Juniartina, P. P. (2019). Analisis Kebutuhan Untuk Pengembangan Media Pembelajaran IPA Berbasis Mind Mapping. *Jurnal Pendidikan dan Pembelajaran Sains Indonesia*, 2(2), 71-79.
- Dewi, S. P., Ardana, I. K., & Asri, I. G. A. A. (2020). Model Pembelajaran Snowball Throwing Berbantuan Media Audio Visual Terhadap Kompetensi Pengetahuan IPA. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 4(2), 296-305.
- Dinatha, N., & Laksana, D. N. L. (2017). Kesulitan Belajar Siswa Dalam Mata Pelajaran IPA Terpadu. *Jurnal Pendidikan Dasar Nusantara*, 2(2), 214-223.
- Fredricks, J. A., Filsecker, M., & Lawson, M. A. (2016). Student Engagement, Context, And Adjustment: Addressing Definitional, Measurement, And Methodological Issues. *Learning and Instruction Journal*, 43, 1-4.
- Hadi, S & Novaliyosi (2019). TIMSS INDONESIA (Trends in International Mathematics and Science Study). *Prosiding Seminar Nasional & Call for Papers*. Tasikmalaya, Indonesia. 562-569.
- Ibrahim, N. F. S. C., Rusli, N. F. M., Shaari, M. R., & Nallaluthan, K. (2021). Students' Perceptions of Interactive Multimedia Applications in the 21st Century Teaching and Learning Process. *Online Journal for TVET Practitioners*, 6(1), 15-24.
- Insani, M. D. (2016). Studi Pendahuluan Identifikasi Kesulitan Dalam Pembelajaran Pada Guru Ipa Smp Se-Kota Malang. *Jurnal Pendidikan Biologi Volume*, 7(2), 81-93.
- Juniati, N., & Jamaluddin, J. (2020). Penerapan ICT Terhadap Keterampilan Saintifik Peserta Didik pada Pembelajaran IPA. *Jurnal Ilmiah Profesi Pendidikan*, 5(2), 124-128.
- Khodir, A. (2018). *Manajemen Pembelajaran Saintifik Kurikulum 2013 Pembelajaran Berpusat Pada Siswa*. Pustaka Setia. Bandung.
-

- Khoiriah, Jalmo, T., & Abdurrahman. (2016). The Effect of Multimedia-Based Teaching Materials in Science Toward Students' Cognitive Improvement. *Jurnal Pendidikan IPA Indonesia*, 5(1), 75-82.
- Kurniawati, A., Festiyed., & Asrizal. (2019). Analisis Efektifitas Multimedia Interaktif Dalam Menghadapi Tantangan Pendidikan di Era Globalisasi Industri 4.0. *Jurnal Penelitian Pembelajaran Fisika*, 5(2), 147-154.
- Lestari, A., & Irwandi. (2019). Kemampuan Kognitif Siswa dengan Menggunakan Model Pembelajaran Kooperatif Tipe Snowball Throwing pada Pembelajaran IPA di SMP Negeri 23 Seluma. *Prosiding Seminar Nasional Sains Dan Entrepreneurship VI*. Semarang, Indonesia. 1-7.
- Maison, Syahrial, Syamsurizal, & Tanti. (2019). Learning Environment, Students' Beliefs, and Self-Regulation in Learning Physics: Structural Equation Modeling. *Journal of Baltic Science Education*, 18(3), 389-403.
- Manula, K., Tambunan, E. P. S., Sari, O. P. (2022). Snowball Throwing Learning Model: Increase Student Activity and Learning Outcomes. *Journal of Education and Teaching Learning (JETL)*, 4(1), 1-13.
- Mulyani, Y., Hidayat, Y., Hidayat, Y., Yudiyanto, M. (2022). Pengaruh Penggunaan Model Pembelajaran Kooperatif Tipe Snowball Throwing Terhadap Motivasi dan Hasil Belajar Siswa. *Jurnal Ilmiah Wahana Pendidikan*, 8(4), 239-252.
- Novianto, L. A., Degeng, I. N. S., & Wedi, A. (2018). Pengembangan Multimedia Interaktif Mata Pelajaran IPA Pokok Bahasan Sistem Peredaran Darah Manusia untuk Kelas VIII SMP Wahid Hasyim Malang. *Jurnal Kajian Teknologi Pendidikan*, 1(3), 257-263.
- OECD. (2019). *Education at a Glance 2019: OECD Indicators*. OECD Publishing. Paris.
- Pangestu, R. D., Mayub, A., & Rohadi, N. (2018). Pengembangan Desain Media Pembelajaran Fisika SMA Berbasis Video Pada Materi Gelombang Bunyi. *Jurnal Kumparan Fisika*, 1(1), 48-55.
- Parata, T. P., & Zawawi, M. (2018). Pemanfaatan Multimedia Interaktif Pembelajaran IPA-Biologi Terhadap Motivasi dan Kemampuan Kognitif Siswa SMP Negeri 14 Kota Palembang. *Jurnal Ecoment Global*, 3(2), 183-197.
- Permendikbud. (2018). *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 35 Tahun 2018 Tentang Kurikulum 2013 Pada Pendidikan Dasar dan Pendidikan Menengah*. Kemendikbud. Jakarta.
- Permendikbud. (2016). *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 22 Tahun 2016 Tentang Standar Proses Pendidikan Dasar dan Menengah*. Kemendikbud. Jakarta.
- Pohan, L. A. (2014). Penerapan Teori Piaget pada Pembelajaran IPA di SMP. *Jurnal Keguruan*, 2(1), 167-172.
- Purfitasari, S., Masrukhi, Prihatin, T., Mulyono, S. E. (2019). Digital Pedagogy Sebagai Pendekatan Pembelajaran di Era Industri 4.0. *Prosiding Seminar Nasional Pascasarjana UNNES*. Semarang, Indonesia. 806-811.
- Purdiyanto., Sapri, J., Kristiawan, M., Badeni., & Arifahrahmi. (2022). Natural Science Learning Results Using the Conventional Method and the Snowball Throwing Method. *International Journal of Multicultural and Multireligious Understanding*, 9(1), 249-259.
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- Prihatini, E. (2017). Pengaruh Metode Pembelajaran dan Minat Belajar Terhadap Hasil Belajar IPA. *Jurnal Formatif*, 7(2), 171-179.
- Rahmat, S. T. (2015). Pemanfaatan Multimedia Interaktif Berbasis Komputer Dalam Pembelajaran. *Jurnal Pendidikan dan Kebudayaan Missio*, 7(2), 196-208.
- Rante, P., Sudarto, & Ihsan N. (2013). Pengembangan Multimedia Pembelajaran Fisika Berbasis Audio-Video Eksperimen Listrik Dinamis Di SMP. *Jurnal Pendidikan IPA Indonesia*, 2(2), 203-308.
- Rosalina, S. S & Suhardi, A. (2020). Need Analysis of Interactive Multimedia Development with Contextual Approach on Pollution Material. *Integrative Science Education and Teaching Activity Journal*, 1(1), 93-108.
- Rusli, M., Hermawan, D., & Supuwingsih, N. N. (2017). *Multimedia Pembelajaran yang Inovatif*. CV Andi Offset. Yogyakarta.
- Sholihah, A.N., Septiani, I., Rejekiningsih, T., Triyanto, & Rusnaini. (2020). Development of Interactive Multimedia Learning Courseware to Strengthen Students' Character. *European Journal of Educational Research*, 9(3), 1267-1279.
- Syofyan, H., & Ismail. (2018). Pembelajaran Inovatif dan Interaktif dalam Pembelajaran IPA. *Media Pengabdian Kepada Masyarakat*, 4(1), 65-75.
- Syukraini., & Advinda, L. (2020). Analysis of Problems and Needs of Interactive Multimedia on Natural Science Learning Based on Scientific Approach at SMPN 1 Kecamatan Mungka. *International Journal of Progressive Sciences and Technologies (IJPSAT)*, 22(2), 227-231.
- Tegeh, I. M., Jampel, I. N., & Ketuk, P. (2014). *Model Penelitian Pengembangan*. Graha Ilmu. Yogyakarta.
- Tien, L. C., Chiou, C. C., & Lee, Y. S. (2018). Emotional Design in Multimedia Learning: Effects of Multidimensional Concept Maps and Animation on Affect and Learning. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(12), 1-17.
- Wardani, S. K. M., Setyosari, P., & Husna, A. (2019). Pengembangan Multimedia Tutorial Mata Pelajaran IPA Pokok Bahasan Sistem Tata Surya Kelas VII MTS Raudlatul Ulum Karangploso. *Jurnal Kajian Teknologi Pendidikan*, 2(1), 23-29.
- Wijoyo, A. (2018). Pengaruh Hasil Belajar Siswa Dengan Menggunakan Multimedia Pembelajaran Interaktif Untuk Sekolah Menengah Pertama Dan Sekolah Menengah Atas. *Jurnal Informatika Universitas Pamulang*, 3(1). 46-55.

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