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INCREASING STUDENTS' LEARNING MOTIVATION ON LIGHT MOTION MATERIAL WITH A SCIENTIFIC APPROACH WITH THE ASSISTED BY SIMPLE PRODUCT

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Abstract :
This research aims to determine the optimization of students' learning motivation in rectilinear motion material through a scientific approach with the help of simple product. This research began with problems found in one of the junior high schools in Jombang, which had a low level of learning motivation. This research is quantitative research with a one shot case study, namely giving a posttest after students have been given treatment. The subjects of this research were 24 students in 8th grade of junior high school. The data sources in this research were teacher and students. Data from teacher is in the form of observations of learning implementation using a scientific approach. Then the data from students is in the form of posttest results, which are given after learning has been carried out using a scientific approach. The implementation of learning is assessed based on steps from a scientific approach. After obtaining implementation and posttest observation data, the data is then presented as a percentage so that the criteria are known. The results of this research indicate an increase in the learning motivation of 8th grade of junior high school students after implementing science learning with a scientific approach. This is shown in the posttest results of students with an average of 82 and the results of implementing scientific learning with an average of 92.5%. Thus, it can be seen that one way to raise students' learning motivation in science subjects, especially rectilinear movement material, is by using a scientific approach.

Keywords: Motivation, Rectiliner Movement, Scientific Approach, Simple Product

INTRODUCTION

Education is a process that aims to improve the quality of life in various subjects (Kompri, 2015). With education, humans will try to increase the value of individual behavior in society from a certain situation to a better situation. All of this can be achieved in good learning activities that are

packaged attractively so as to obtain superior human resource results and be able to compete with developed countries (Sasomo, 2022). Thus, education is important so that individual quality can increase and be able to compete with other countries.

The desire to learn can certainly increase the success of learning achievement. The desire to learn is usually known as motivation. Apart from that, it is important for students to have motivation to learn, because by having this it will be easier for them to face and solve problems in learning. (Lestari et al., 2018). Students' motivation to learn lies in their desire to find the most appropriate cognitive strategy, so that this will help them learn (Panisoara et al., 2015). Therefore, student learning motivation is very important to develop in students.

In education, it is not uncommon to find students who lack motivation to learn. This can be seen from students who are easily bored or passive in learning, making students less active and tense when studying (Tinenti, 2018). Lack of motivation in learning has a negative impact on students (Melati et al., 2018). These impacts include hampered academic achievement, less than optimal utilization of one's potential, and decreased student interest in certain fields of study. Therefore, student learning motivation is something that really needs to be encouraged so that learning goals can be achieved. Several things to increase student motivation include creating learning that is interactive, attracts attention, and can be related to everyday life (Murtado et al., 2023). Therefore, students' low learning motivation needs to be addressed.

Based on the results of a questionnaire distributed to students at one of the junior high schools in Jombang, it was found that students had a low level of learning motivation in science subjects with a percentage of 48%. In distributing the questionnaire, students stated that they would only study science when daily assessments were carried out. Of course, this shows that students' motivation to study science is still very low. This is reinforced by the results of interviews with science teachers at junior high schools, showing that many students lack motivation in learning science. This is shown by the number of students who are sleepy during the science learning process. According to students, the most difficult material in science subjects is straight motion material, with a percentage of 83%. This is also in line with research conducted by Ady which stated that rectilinear movement material is material that is difficult for students to understand (Ady, 2022) so there is a need for learning that makes students carry out their own experiments on rectilinear motion material (Dani et al., 2019).

Based on these results, to achieve learning objectives, it is necessary for teachers to continue to foster learning motivation in students and involve them to be active in learning. This can be done by paying attention to several factors that can increase student motivation (Hita, 2017). In the last few decades, developments in the field of education have encouraged teachers to increase students' motivation in learning by looking for relevant learning methods (Sappaile et al., 2023). In essence, a teacher is a facilitator in both cognitive, affective and psychomotor aspects so that the teacher's role is to provide facilities and create an atmosphere that is conducive to learning and able to encourage students to learn. (Asmani, 2016). Thus, it is very important for teachers to apply a learning approach that can increase student motivation, especially in rectilinear movement material which is considered difficult for most students.

One effort to increase student motivation in the learning process is by applying a scientific approach to science learning. This is intended so that students can be more active in learning (Tinenti, 2018). The scientific approach is an approach that is centered on students so that students are active in trying to understand concepts, laws or principles with the stages of observing, formulating problems, making hypotheses, collecting data, analyzing data, and ending in making conclusions and communicating the results that have been obtained. (Handayani, 2023). A scientific approach can enable students to learn independently (Putri et al., 2020). The scientific approach to the learning process is generally an implementation of the 2013 curriculum in schools (Tias et al., 2019) which is in accordance with the curriculum used at the junior high school where the research was conducted . This is also in accordance with the interests of students at one of the junior high schools in Jombang based on the results of a questionnaire which stated that most students were more enthusiastic about learning science using the practicum method with a percentage of 71% of students.

To motivate students' learning and to make it easier to understand the concept, it is necessary to have learning media, especially in the form of teaching aids that can help students understand it. Teaching aids are intermediaries or introducers of learning messages. Learning using teaching aids

means optimizing the function of all students' five senses to increase the effectiveness of students learning by hearing, seeing, feeling and using their minds logically and realistically. (Widiyatmoko & Pamelasari, 2012).

The simple product applied in this research are props for uniform straight motion and uniform straight and changing motion, which in the manufacturing process only require simple materials that are easy to find in everyday life. These props practice the straight motion that occurs when the car is moving, so that students understand it more easily because they can see the straight motion demonstration directly. Thus, teaching aids are an important tool to use in increasing students' learning motivation.

The aim of this research is to find out the application of a scientific approach assisted by simple teaching aids in straight movement material in increasing junior high school students' learning motivation. Considering the importance of increasing students' learning motivation and making it easier for students to understand rectilinear motion material, it is necessary to solve the problem of how to apply a scientific approach assisted by simple product in increasing students' learning motivation in rectilinear motion material.

RESEARCH METHOD

This research uses descriptive quantitative methods, namely analyzing data by describing or illustrating the data that has been collected as it is without intending to draw applicable conclusions (Ali, 2006). The sampling technique in this research is the random sampling technique which is a sampling technique that provides an equal opportunity for each element (member) of the population to be selected as a member of the sample. (Susanti, 2019). The research design used was a One Shot Case Study, in which the subjects were given treatment which is followed by observation during the implementation of the treatment and measuring the effects of the treatment by carrying out a posttest (Nirfayanti & Nurbaeti, 2019).

The research subjects used in this research were 8th grade students, totaling 24 junior high school students. This research took a sample of grade 8 students because based on the 2013 curriculum, rectilinear movement material is taught in grade 8 at junior high school level in odd semesters. In this research, the independent variable studied was increasing students' learning motivation in straight movement material. Meanwhile, the control variable in this research is the application of a scientific approach assisted by simple teaching aids. Data sources come from two sources, namely students and teachers. Students as a data source in obtaining data about increasing learning motivation in straight movement material. Meanwhile, the teacher is the data source to obtain data on the success of learning implementation using a scientific approach assisted by simple teaching aids. Data collection from students was carried out by giving a posttest after learning, while data collection from teachers was carried out by observing the implementation of learning using a scientific approach assisted by simple product to straight movement material.

The data collection techniques used in this research were tests and observations. The test is used to determine students' knowledge achievement in rectilinear motion material. Meanwhile, observation sheets are used to see and assess the ongoing learning process. In assessing the observation sheet, a questionnaire assessment model with yes no questions is used, namely a questionnaire containing questions with a choice of "yes" or “no” (Sugiyono, 2017). Information on the implementation of observation results can be seen in the following table from (Riduwan, 2016).

Table 1. Description of learning implementation

Description	Score
Yes	1
No	0

The research carried out is considered successful if the students have a high level of motivation. This can be seen from the students' posttest results. The data analysis technique used in this action research is descriptive qualitative data analysis techniques. Descriptive quantitative data analysis techniques were used to calculate the average value of increased student activity and student learning motivation. The formula used to calculate teacher and student activity uses an average formula in percentage form (%). Likewise, the assessment aspect used to measure the level of student learning

motivation can be seen from individual completion and expressed in an average formula in the form of a percentage (%). The percentage formula is % = n (amount obtained) / N (total score) X 100% (Wasilah, 2012).

Qualitative data analysis techniques are used to provide an overview of research results, provide descriptive presentation and draw conclusions. Qualitative data analysis to measure student activity levels with assessment criteria from (Tinenti, 2018)**,** which can be seen in Table 2.

Table 2. Criteria for student activity level and motivation level

Score (%)	Activity level
$90 < x \leq 100$	Very good
$70 < x \leq 90$	good
$50 < x \leq 70$	Pretty good
$30 < x \leq 50$	Not good
≤ 30	Very not good

Meanwhile, data analysis to measure students' motivation levels can be seen from the students' posttest results which are then categorized as in Table 3 below.

Table 3. Criteria for student activity level and motivation level

Score	Motivation level
$90 < x \leq 100$	Very high
$70 < x \leq 90$	High
$50 < x \leq 70$	Pretty high
$30 < x \leq 50$	Not high
≤ 30	Very not high

RESULTS AND DISCUSSION

Initial planning in this research, namely creating a framework. This framework aims to ensure that the research carried out can be directed and planned well and correctly in accordance with established procedures. In order to achieve this goal, researchers acting as teachers take steps including: a) preparing facilities and infrastructure; b) prepare and compile learning plans; c) compiling observation assessment instruments; d) compiling test instruments; and e) prepare a list of student attendance. This is done because before implementing learning, learning tools are needed so that it can run in a directed manner. In line with what Soleh & Arifin stated, learning tools are a set of tools that have a role in supporting the learning process consisting of learning plans or teaching modules, teaching materials. worksheets, and assessments (Soleh & Arifin, 2021).

Observation activities include: a) preparing all learning facilities and infrastructure; b) carry out learning activities in accordance with previously prepared learning plans; c) observer (observer) makes observations of teacher and student activities; d) researchers make observations of student activities and also observations of student learning motivation; e) carrying out learning; f) researchers also carry out analysis and determine strategies to overcome student problems in class so that there is an increase in student learning motivation; g) carry out analysis of learning evaluation results; and h) carrying out activities in stages, namely planning, implementation and observation (observation), and reflection. In line with what Uyuni stated, to assess the implementation of learning, what is done is to observe the suitability between learning tools and the realization of learning (Uyuni et al., 2023).

Based on the assessment that has been carried out from the planning process to the implementation stage, the students' posttest results can be seen in the following table.

Table 4. Students' posttest results

Name of Student	Score	Criteria
1st student	91	Very high
2st student	94	Very high
3st student	97	Very high
4st student	85	High
5st student	94	Very high
6st student	60	Pretty High
7st student	100	Very high
8st student	97	Very high
9st student	88	High
10st student	93	Very high
11st student	97	Very high
12st student	70	Pretty High
13st student	57	Pretty High
14st student	97	Very high
15st student	90	High
16st student	46	Not high
17st student	91	Very high
18st student	51	Pretty High
19st student	24	Very not high
20st student	95	Very high
21st student	100	Very high
22st student	88	High
23st student	79	High
24st student	85	High
Mean	82	High

Based on the posttest results of students after learning straight movement material using a scientific approach, students had a posttest average of 82. Based on Table 3 regarding the criteria for students' motivation levels, if the percentage of posttest results is between the values $70 < x \leq 90$, then motivation student learning is said to be high. Thus, it can be seen that the application of learning material in rectilinear motion with a scientific approach assisted by simple teaching aids can increase students' learning motivation.

This is reinforced by research conducted by Yanti (2018) which shows that a scientific approach can increase students' learning motivation. In his research, the average student scores in Cycles I and II were 69.91% and 81.43% respectively. It can be concluded that the increase in student learning motivation towards group absorption from Cycles I to II was 11.52%. Apart from that, the role of simple teaching aids in increasing students' learning motivation is strengthened by research conducted by Santoso which states that teaching aids can increase students' learning motivation. This is proven by the assessment results in cycle I. The average score obtained was 75.53, with the KPM category being medium. In cycle II the average score obtained was 85.53 in the high KPM category. In cycle III the average score obtained was 90.68 with the KPM category being very high (Santoso et al., 2020). In this way, learning can adapt to the context of the 2013 curriculum, namely that learning is directed to be based on student learning activities under the guidance, motivation and direction of the teacher (Supriyadi et al., 2022).

In the table, it is shown that there is one student with very low and low criteria. Based on the results of observations of learning implementation, this was because the students were not active during the learning process. Then the observation of learning implementation is assessed from 5 points based on the steps of a scientific approach, namely (1) observing, (2) asking, (3) experimenting, (4) associating, and (5) communicating (Elkarimah, 2018). The results of observing the implementation of learning can be seen in the following diagram.

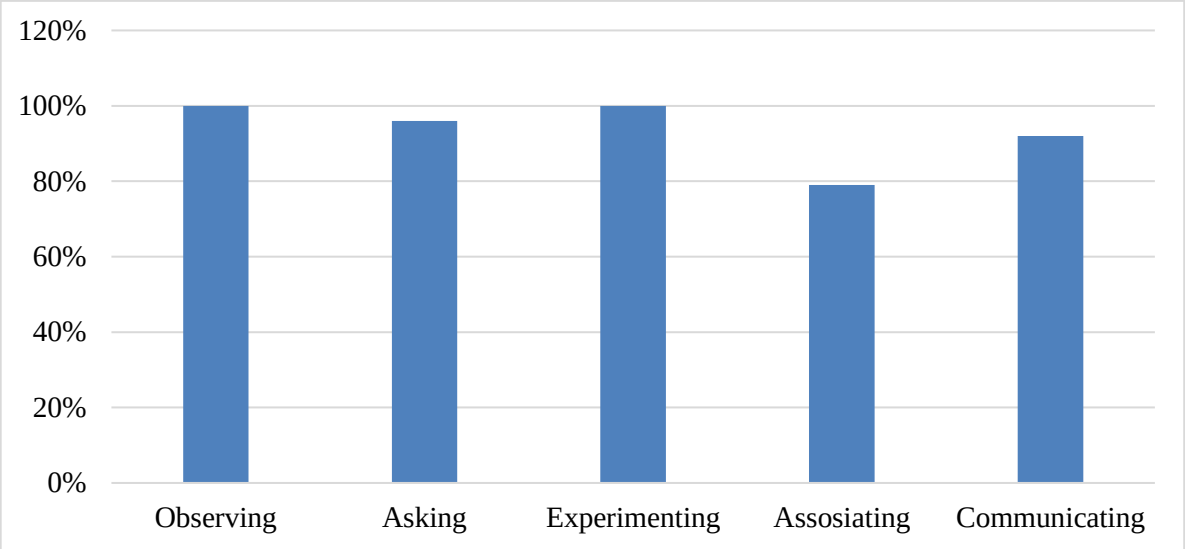

Figure 1 Learning Implementation Diagram

From this diagram, it can be seen that the best steps to implement are the observing and experimenting steps with a percentage of 100%. Then the one with the lowest level of implementation is the associate step with a percentage of 79%. associating or processing information is the process of processing information that has been collected either limited to the results of collecting/experimental activities or the results of observing activities and information gathering activities (Sani, 2015). Students' associating or reasoning activities sometimes experience problems with several problems (Hasanah et al., 2020). This is because in the associating step, students apply their higher level thinking skills, which include levels C4, C5, and C6. (Sani, 2015). Of course, this makes students with low thinking abilities find this step difficult.

Then, after analyzing the general learning implementation data using a scientific approach assisted by simple teaching aids, an analysis of each individual student was carried out and an analysis of the overall learning implementation was carried out. Analysis of each individual student and overall analysis can be seen in Table 5 below

Table 5. Observation results of student implementation

Name of Student	Activity					Percentage
	1	2	3	4	5	(%)
1st student	v	v	v	v	x	80
2st student	v	v	v	v	v	100
3st student	v	v	v	v	v	100
4st student	v	v	v	v	v	100
5st student	v	v	v	v	v	100
6st student	v	v	v	x	v	80
7st student	v	v	v	v	v	100
8st student	v	v	v	v	v	100
9st student	v	v	v	v	v	100
10st student	v	v	v	v	v	100
11st student	v	v	v	v	v	100
12st student	v	v	v	x	v	80
13st student	v	v	v	x	v	80
14st student	v	v	v	v	v	100
15st student	v	v	v	v	v	100
16st student	v	v	v	x	x	60
17st student	v	v	v	v	v	100
18st student	v	v	v	v	v	100
19st student	v	x	v	x	x	40
20st student	v	v	v	v	v	100
21st student	v	v	v	v	v	100
22st student	v	v	v	v	v	100
23st student	v	v	v	v	v	100
24st student	v	v	v	v	v	100
Percentage (%)	100	96	100	79	92	92,5

From this table, it can be seen that the final percentage of learning implementation using a scientific approach is 92.5%. Based on Table 2 regarding the criteria for the level of learning implementation, if the average observation results for learning implementation is $90 < x \leq 100$, then it is included in the very good criteria. In Table 4, there are students with the lowest percentage of implementation, namely 40%. This means that the students' posttest results in Table 3 also include very low motivation. However, only one student had a low percentage of implementation. Based on statements from the science teacher in this class, it is known that the 19th student does have low academic abilities and learning motivation. This is supported by research conducted by Budiariawan which states that students' learning motivation influences their learning outcomes. If students' learning motivation is high, then their learning outcomes will be high, and vice versa (Budiariawan, 2019).

From the posttest results and observations of learning implementation which gave very high and very good results, it can be seen that a scientific approach assisted by simple teaching aids can increase students' learning motivation. This is supported by research conducted by Mayasari which shows that the application of a scientific approach can increase students' learning motivation in science material (Mayasari et al., 2019). Apart from that, other supporting research is research conducted by Syafitri which states that students' learning motivation increases after learning with simple product is implemented. (Syafitri, 2020). Relevant research was also conducted by Sari who stated that science learning based on learning media had a significant effect on junior high school students' learning motivation, with a value of Sig. (2-tailed) in the t test of $0.000 < 0.05$ which means H0 is rejected and Ha is accepted (Mega Puspita Sari et al., 2021).

In this research, it can be seen that one way to raise students' enthusiasm for learning science is by applying a scientific approach with the help of simple product. Simple product can be made from used materials or other materials. It is recommended for science teachers to always be innovative in teaching so that students can increase their learning motivation during learning. One way is with a

scientific approach assisted by simple teaching aids. However, it is more recommended to make simple product from used materials so that it doesn't cost too much.

CONCLUSION

Based on the results of the analysis and discussion of the action research that has been carried out, it can be concluded that a scientific approach to rectilinear movement material can increase students' learning motivation with an average student posttest of 82 with very high learning motivation criteria. Apart from that, the application of scientific learning on rectilinear motion material can also be implemented smoothly with a percentage of 92.5 and has a very good level.

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REFERENCES

Ady, W. N. (2022). Analisis kesulitan belajar siswa sma terhadap mata pelajaran fisika pada materi gerak lurus beraturan. *Jurnal Pendidikan Dan Ilmu Fisika*, *2*(1), 104. https://doi.org/10.52434/jpif.v2i1.1599

Ali, M. (2006). Teknik Analisis Kualitatif. *Makalah Teknik Analisis II*, 1–7.

Asmani. (2016). *Tips Efektif Cooperative Learning: Pembelajaran Aktif, Kreatif, dan Tidak Membosankan*. Diva Press.

Budiariawan, I. P. (2019). Hubungan motivasi belajar dengan hasil belajar pada mata pelajaran kimia. *Jurnal Pendidikan Kimia Indonesia*, *3*(2), 103. https://doi.org/10.23887/jpk.v3i2.21242

Dani, R., Latifah, N. A., & Putri, S. A. (2019). Penerapan pembelajaran berbasis discovery learning melalui metode talking stick untuk meningkatkan pemahaman konsep gerak lurus. *EduFisika*, *4*(02), 24–30. https://doi.org/10.22437/edufisika.v4i02.6058

Elkarimah, M. F. (2018). Penerapan saintifik pada pembelajaran pendidikan agama islam (SD Islam Bina Insani Muslim Bekasi). *SAP (Susunan Artikel Pendidikan)*, *3*(1), 69–77. https://doi.org/10.30998/sap.v3i1.2740

Handayani, F. (2023). Pendekatan saintifik dalam pembelajaran ipa sebagai upaya meningkatkan aktifitas dan hasil belajar siswa kelas IXB SMPN 6 Rejang Lebong. *Pendidikan Guru 2023*, *4*(5). https://doi.org/10.47783/jurpendigu.v4i2

Hasanah, H., Nugraheni, P., & Purwoko, R. Y. (2020). Analisis kendala penerapan pendekatan saintifik dalam pembelajaran barisan dan deret geometri. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *11*(1), 16–26. https://doi.org/10.15294/kreano.v11i1.20663

Hita. (2017). Pengaruh penerapan model pembelajaran kooperarif tipe NHT terhadap hasil belajar teknik dasar passing control kaki bagian dalam sepak bola. *Jurnal Pendidikan Jasmani, Olahraga, Dan Kesehatan Undiksha*, *5*(2). https://doi.org/10.23887/jjp.v5i2.14784

Kompri. (2015). *Manajemen Pendidikan: Komponen-komponen Elementer Kemajuan Sekolah*. Ar-Ruzz Media.

Lestari, W., Pratama, L. D., & Jailani, J. (2018). Implementasi pendekatan saintifik setting kooperatif tipe stad terhadap motivasi belajar dan prestasi belajar matematika. *AKSIOMA : Jurnal Matematika Dan Pendidikan Matematika*, *9*(1), 29. https://doi.org/10.26877/aks.v9i1.2332

Mayasari, D. D., Wardianti, Y., & Febrianti, Y. (2019). Pengaruh pendekatan saintifik terhadap motivasi dan hasil belajar biologi siswa. *BIOEDUSAINS: Jurnal Pendidikan Biologi Dan Sains*, *2*(2), 93–103. https://doi.org/10.31539/bioedusains.v2i2.861

Mega Puspita Sari, M., Indrawati, I., & Budiarso, A. S. (2021). Pengaruh pembelajaran ipa berbasis phet terhadap motivasi dan hots siswa smp. *EduFisika: Jurnal Pendidikan Fisika*, *6*(2), 64–71. https://doi.org/10.59052/edufisika.v6i2.12546

Melati, E., Dara Fayola, A., Putu Agus Dharma Hita, I., Muh Akbar Saputra, A., & Ninasari, A. (2018). Pemanfaatan animasi sebagai media pembelajaran berbasis teknologi untuk meningkatkan motivasi belajar. *Journal on Education*, *6*(1), 732–741. https://doi.org/10.31004/joe.v6i1.2988

Murtado, D., Hita, I. P. A. D., Chusumastuti, D., Nuridah, S., Ma'mun, A. H., & Yahya, M. D. (2023). Optimalisasi pemanfaatan media pembelajaran online sebagai upaya meningkatkan hasil belajar siswa di sekolah menengah atas. *Journal on Education*, *6*(1), 35–47. https://doi.org/10.31004/joe.v6i1.2911

Nirfayanti, & Nurbaeti. (2019). Pengaruh media pembelajaran google classroom dalam pembelajaran analisis real terhadap motivasi belajar mahasiswa. *Jurnal Penelitian Matematika Dan Pendidikan Matematika*, *2*(1), 50–59.

Panisoara, G., Duta, N., & Panisoara, I.-O. (2015). The influence of reasons approving on student motivation for learning. *Procedia - Social and Behavioral Sciences*, *197*(February), 1215–1222. https://doi.org/10.1016/j.sbspro.2015.07.382

Putri, I. T., Aminoto, T., & Pujaningsih, F. B. (2020). Pengembangan E-Modul fisika berbasis pendekatan saintifik pada materi teori kinetik gas. *EduFisika*, *5*(1), 52–62. https://doi.org/10.22437/edufisika.v5i01.7725

Qurrotul Uyuni, Noer Af'idah, & Fajrul Falah. (2023). Kepraktisan dan efektivitas media flashcard modifikasi pada materi interaksi antar makhluk hidup bagi siswa SMP/MTs. *Ed-Humanistics : Jurnal Ilmu Pendidikan*, *8*(01), 947–952. https://doi.org/10.33752/ed-humanistics.v8i01.4862

Riduwan. (2016). *Skala Pengukuran Variabel-Variabel Penelitian*. Anggota Ikatan Penerbit Indonesia (IKAPI).

Sani, A. H. (2015). Pembelajaran matematika berbasis pendekatan saintifik dan kaitannya dengan menumbuhkan keterampilan berpikir tingkat tinggi. *Jurnal Pendidikan Seminar Nasional Matematika Dan Pendidikan Matematika UNY*, 57–62.

Santoso, B., Putri, D. H., & Medriati, R. (2020). Upaya meningkatkan motivasi belajar dan kemampuan pemecahan masalah siswa melalui model problem based learning berbantu alat peraga konsep gerak lurus. *Jurnal Kumparan Fisika*, *3*(1), 11–18. https://doi.org/10.33369/jkf.3.1.11-18

Sappaile, B. I., Ahmad, Z., Putu, I., Dharma Hita, A., Razali, G., Lokita, R. D., Dewi, P., & Punggeti, R. N. (2023). Model pembelajaran kooperatif: apakah efektif untuk meningkatkan motivasi belajar peserta didik?. *Journal on Education*, *6*(1), 6261–6269. https://doi.org/10.31004/joe.v6i1.3830

Sasomo, B. (2022). Meningkatkan motivasi belajar siswa dengan penugasan vidio pada pembelajaran pendekatan saintifik. *Jurnal Edumatic : Jurnal Pendidikan Matematika*, *1*(01), 22–29. https://doi.org/10.21137/edumatic.v1i01.451

Soleh, A. R., & Arifin, Z. (2021). Integrasi Keterampilan Abad 21 dalam Pengembangan Perangkat Pembelajaran Pada Konsep Community of Inquiry. *QALAMUNA: Jurnal Pendidikan, Sosial, Dan Agama*, *13*(2), 473–490. https://doi.org/10.37680/qalamuna.v13i2.995

Sugiyono. (2017). *Metode Penelitian Bisnis: Pendekatan Kuantitatif, Kualitatif, Kombinasi, dan R & D*. CV. Alfabeta.

Supriyadi, S., Wati, M., Miriam, S., & Sasmita, F. D. (2022). Efektivitas materi ajar gerak lurus bermuatan authentic learning untuk melatihkan keterampilan pemecahan masalah. *EduFisika: Jurnal Pendidikan Fisika*, *7*(1), *Jurnal Pendidikan Fisika*, *7*(1), 62–71. https://doi.org/10.59052/edufisika.v7i1.19877

Susanti, R. (2019). Sampling dalam penelitian pendidikan. *Jurnal Teknodik*, *16*, 187–208. https://doi.org/10.32550/teknodik.v0i0.543

Syafitri, D. (2020). Peningkatan motivasi dan hasil belajar matematika melalui alat peraga pada siswa sekolah dasar. *Teacher in Educational Research*, *2*(2), 63. https://doi.org/10.33292/ter.v2i2.77

Tanjung, R. D. A., Marnita, M., & Malik, A. (2020). Efektifitas pengunaan media/alat peraga sederhana di tengah pandemi terhadap motivasi belajar siswa sma di Desa Kubu Raya. *JEMAS: Jurnal Edukasi Matematika Dan Sains*, *1*(1), 48–51.

Tias, D. M., Astalini, A., & Pathoni, H. (2019). Desain media pembelajaran fisika menggunakan software prezi berbasis scientific materi tata surya kelas viii. *EduFisika*, *4*(01), 69–78. https://doi.org/10.22437/edufisika.v4i01.4523

Tinenti, Y. R. (2018). *Model Pembelajaran Berbasis Proyek (PBP) dan Penerapannya dalam Proses Pembelajaran di Kelas*. Deepublish.

Wasilah. (2012). Peningkatan kemampuan menyimpulkan hasil praktikum. *Jurnal Pendidikan IPA Indonesia*, *1*(1), 82–90. https://doi.org/10.15294/jpii.v1i1.2018

Widiyatmoko, A., & Pamelasari, S. D. (2012). Pembelajaran berbasis proyek untuk mengembangkan ALAT peraga IPA dengan memanfaatkan bahan bekas pakai. *Jurnal Pendidikan IPA Indonesia*, *1*(1), 51–56. https://doi.org/10.15294/.v1i1.2013