Development of RPP-LKPD Based on the *Ber2P3* Learning Model on Student Concept Mastery on Vibration and Wave Materials

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Abstract: This research is development research that aims to describe the validity, practicality and effectiveness of learning devices using the Ber2P3 learning model in the form of lesson plans and LKPD on Vibration and Wave material with research subjects involving 25 students of class VIII Tahfiz MTs Al Huda Gorontalo. Based on the validity of the RPP and LKPD based on the Ber2P3 learning model, it meets the valid criteria with an average value of 90%, the practicality of the RPP based on the Ber2P3 Learning model as seen from the implementation of learning with the first and second meeting values ranging from 78% and 87% including good criteria. Student responses meet the good criteria with a score of 80%. The effectiveness of RPP and LKPD Ber2P3 is seen through the activities of students who meet the good criteria with a value of 83% and a learning outcome test with 84% classical completeness. Based on the results of the study, it can be concluded that the lesson plans and LKPD using the Ber2P3 learning model of vibration and wave material meet the criteria of valid practical and effective

Keywords: Ber2P3 Learning Model; Effectiveness; Practicality; Validity

Introduction

Education is important in the process of forming human resources. Through education, humans gain knowledge and empirical experience that is very useful for their lives, and can develop themselves according to their respective potential (Bell & Bell, 2020; Wan et al., 2021). Education will continue to process along with the times, currently education in schools takes place in a structured manner. The current view of education is where the teacher is only a facilitator and the educational process is centered on students (Buchory & Swadayani, 2014).

Learning objectives can be achieved if students are active in learning activities. The form of learner activeness in learning is seen from how he expresses his opinion, responsibility, and involvement in learning groups. Student activeness is a form of independent learning, namely students trying to learn something of their own will and ability or effort so that in this case the teacher only acts as a guide, motivator and facilitator (Aini et al., 2021; Ansyah et al., 2021; Pakaya et al., 2023).

Delivery of material that is considered less effective will cause students to experience rapid boredom with the subjects provided by educators because students are only given reinforcement in the form of memory, making notes in a monotonous form without direct

practice. There is no reinforcement of understanding and critical discovery of ideas, and students will be more likely to be passive which results in boredom. The importance of developing critical thinking skills and mastery of concepts, in fact, is not in line with the current condition of science learning. One of the problems faced in Indonesia is the weakness of the learning process, students are less motivated to develop ways of thinking and how to understand the learning process in class which is only directed to listen to teacher explanations because most teachers still use the lecture method during teaching and learning activities (Faqiroh, 2020; Ramdani et al., 2020).

Based on a review of the results of field studies that have been carried out, it can obtain data that the strategies, models and learning approaches applied by educators have not been able to make students trained in critical thinking skills. Many educators still use learning models that are less varied so that students look passive during the learning process, and many students feel bored because teaching and learning activities in the classroom areotonous and not cool, there are still a lot of students who master science concepts and critical thinking skills that are quite low. The learning model is one of the elements of learning that contributes significantly to various learning systems because it helps in teaching and enables teaching and learning activities. With this learning model, it builds a learning atmosphere so that it does not look monotonous.

The solution to the above problem is by using the Ber2P3 learning model (Thinking, Sharing, Observing, Reporting Exposure). The Ber2P3 learning model is specifically designed to change the learning atmosphere so that students are interested in participating in learning and can improve students' critical thinking skills based on constructivism. students based on constructivism (Supartini, 2021).

Therefore, the author feels interested in conducting research entitled: "Development of RPP-LKPD Based on Ber2P3 Learning Model Towards Student Concept Mastery on Vibration and Wave Material".

Method

The type of research conducted is development research with products developed in the form of RPP (Learning Implementation Plans) and LKPD (Learner Worksheets) on Vibration and Wave material. The Learning Model used in this study is the Ber2P3-based learning model, while the development model uses the ADDIE development model which consists of 5 stages, namely Analysis, Design, Development, Implemetation and Evaluation. The test subjects used in this study were

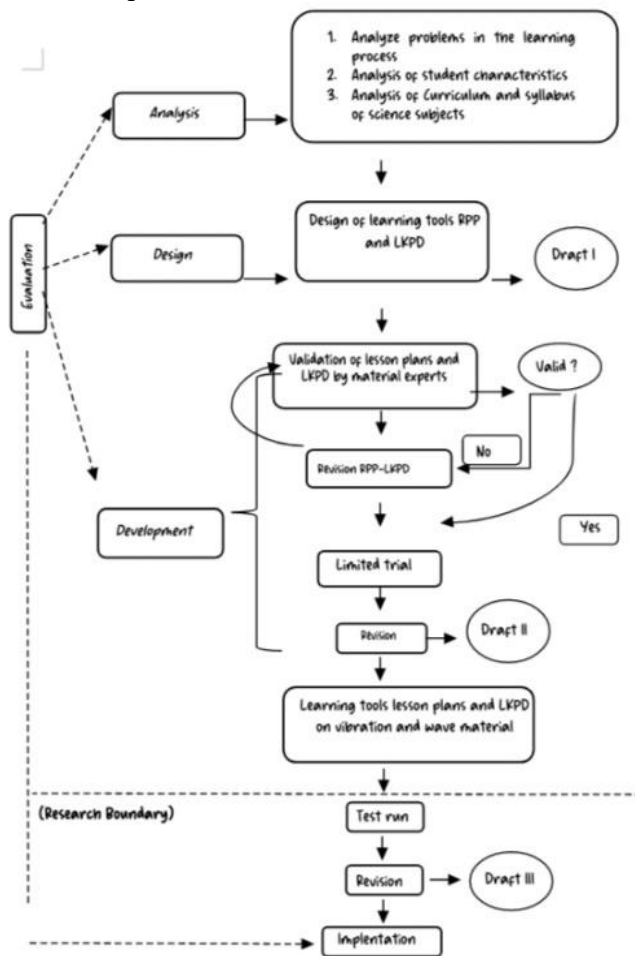limited trials in this study were MTs Al Huda students with 25 respondents.

Figure 1. Procedure Stage of ADDIE Model

Result and Discussion

Learning device validation results

In this research, the first stage carried out is the validation stage. To produce a valid device, it cannot be separated from the validators who have provided corrections and suggestions for the learning devices that have been developed. Validation of this learning device in the form of lesson plans (RPP), student activity sheets (LKPD), and learning outcomes tests (THB). The following are the results of validation of learning devices from 2 validators.

Based on Figure 2, the results of the validation of learning devices obtained that the Learning Implementation Plan (RPP), Learner Worksheet (LKPD), and Learning Outcome Test (THB) using the Ber2P3 learning model on vibrations and waves meet the valid category and are suitable for use "with minor revisions" with an average percentage value on the RPP of 90%, LKPD 92% and THB 94%. Based on the results of the validation RPP with a percentage of 90% LKPD 92% and Learning Outcome Test 94%. According to Budiarso

(2017), the score is included in the "Valid" category with a statement that it can be used with minor revisions.
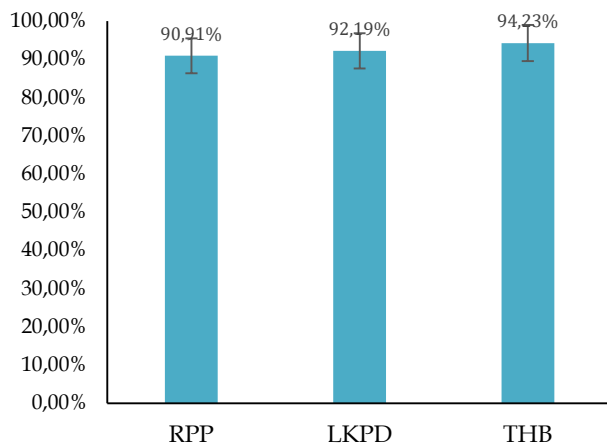

Figure 2. Diagram of Learning Device Validation Results

The validated aspects consist of construction, content, readability, language and appearance. As the opinion expressed by Sabara et al. (2022) which states that Validity is a measure that shows the level of validity or validity of an instrument. The principle of validity is measurement or observation which means the principle of instrument reliability in collecting data (Mulyana & Desnita, 2023; Pandey & Pandey, 2021; Sürücü & Maslakci, 2020). The instrument must be able to measure what should be measured.

Learning Device Practicality Results

The practicality of learning devices is based on the implementation of learning and student response questionnaires. Learning devices are said to be practical if the implementation of learning and students' responses show that the learning devices developed are easy (practical) to do.

Learning Implementation

The implementation of learning in this study was carried out twice a meeting with 25 students present and observed by 2 observers. The following average results of learning implementation data can be seen in the Figure 3.

Based on Figure 3, it can be seen that the percentage of achievement of the implementation of learning for the first meeting 78% of the implementation of the learning process can be carried out well while the learning process that is not well implemented is 22%, at the second meeting that was carried out increased to 87% in the learning process and that was not well implemented as much as 13%. This includes good criteria in the implementation of the learning process.
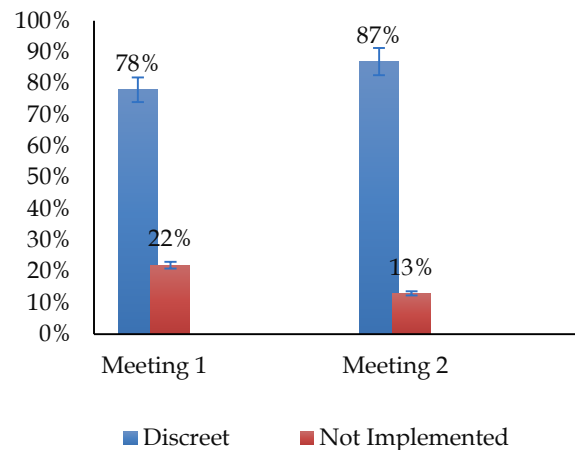

Figure 3. Learning Implementation Diagram

These results mean that the learning stages that have been previously designed in the Learning Implementation Plan (RPP) are generally applied in the learning process using LKPD based on the Ber2P3 learning model. This is in accordance with the opinion Chairunnisa et al. (2022) which reveals that the learning tools developed are said to be practical if the expert states that the learning tools can be applied and used in the field and the practicality of the learning tools developed is based on the implementation of learning in the classroom (Abdulrahaman et al., 2020).

Learner Response Questionnaire

The response of students in this study is the students' response to the use of LKPD based on the Ber2P3 learning model developed by the researcher. Learner response data was obtained through a learner questionnaire sheet consisting of 18 statement items. Scoring for each statement uses a Likert scale.

The learner response questionnaire was filled in by 25 students of MTs Al Huda. The results of the data analysis of students' responses to the LKPD based on the Ber2P3 learning model developed in the limited trial are divided into three indicators, namely: Interest; Satisfaction; confidence. This assessment uses 2 statements, namely positive statements and negative statements. The statement for the Negative questionnaire has a weight with strongly disagree has a weight of 4, disagree has a weight of 3, agree has a weight of 2 and strongly agree has a weight of 1, while for the positive statement questionnaire strongly agree has a weight of 4, agree has a weight of 3, disagree has a weight of 2 and strongly disagree has a weight of 1.

In a limited trial conducted with 25 MTs Al Huda students, the average results of students' responses were obtained where the average percentage score of students' responses was 80%. The average percentage result is included in the "Good" criteria. From the

positive responses obtained through the questionnaire, it shows that the learning tools that have been developed are declared practical in their implementation in the classroom. In line with research conducted by Chairunnisa et al. (2022) which suggests that practical learning devices can help teachers in carrying out the learning process. This is in line with research Gaol (2019), that the results of student responses reached 80% which led to a positive response to the learning device. Another opinion was also expressed by Sujarwinanti & Anshori (2020) that the results of student responses with a percentage of 80% with good criteria can indicate that the responses obtained by students are at a good level of practicality.
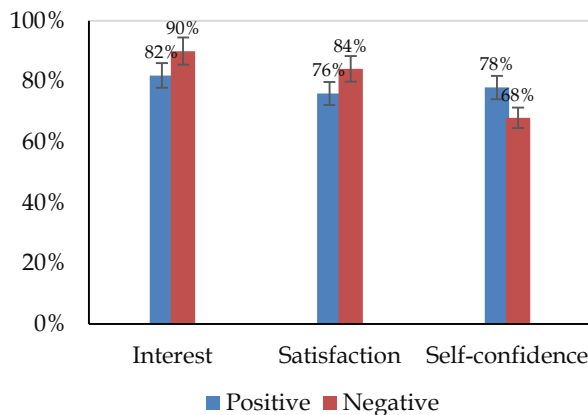

Figure 4. Diagram of Learner Response Questionnaire

Learning Device Effectiveness Results

The effectiveness of the learning tools developed can be seen through student activity and student learning outcomes tests. Learning outcomes test in the form of essay questions totaling 10 items and given to students of class VIII Tahfiz which amounted to 25 people.

Learner Activity

Assessment of learner activity was carried out through the observation sheet of learner activity by 2 observers during two meetings. Data on student activity during learning was analyzed to answer the researcher's question how the activity of students in learning with LKPD based on the Ber2P3 learning model.

Assessment of learner activity was carried out with 25 students of MTS Al Huda. The results of students' activities at the first and second meetings can be seen in the recapitulation shown in Figure 5.

Based on Figure 5 the percentage data obtained shows that the results of students' activities from meetings 1 and 2 are not much different. The diagram of students' activities has the highest percentage with a value of 90% including very good criteria, and has the

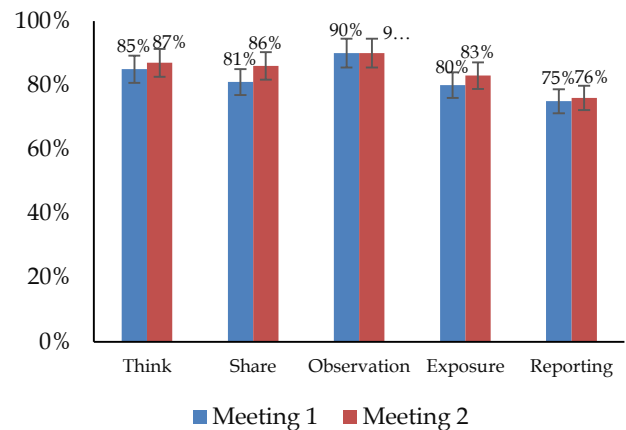lowest percentage with a value of 75% with good criteria.

Figure 5. Diagram of Student Activity

The activities of the Ber2P3 learning model of students starting from Thinking, Sharing, Observing, Exposing and Reporting during the two meetings were generally good. This explanation is as the result of the average percentage of learner activity obtained during the 2 meetings which is 83%, where according to Sukardi (2013) criteria these results indicate that the activities of students during the learning process with RPP-LKPD Based on the Ber2P3 Learning Model are included in the "Good" criteria. This is in line with the opinion according to Hafsah (2017) that observation in learning can increase student knowledge and can improve the quality of learning.

Learning Outcomes

Students' learning outcomes are given to Tahfiz VIII class students totaling 25 students. Tests in the form of essay questions totaling 10 items. For the improvement of student learning outcomes can be seen in the increase in the cognitive level of the question. The results shows that the total number of students is 25 people and students who have scores below the Minimum Completion Criteria (KKM 75) are 4 people. From these results, the percentage of minimum completeness is obtained using the Formula 1.

$$\text{Classical Completeness} = \frac{\text{Learners complete}}{\text{Number of learners}} \, x100 \qquad (1)$$

$$\text{Classical Completeness} = \frac{21}{25} \, x100$$

$$\text{Classical Completeness} = 84\%$$

The Ber2P3 learning model provides more experience for students in learning. The learning process is attempted so that students gain knowledge from their own experience, make observations, train critical

thinking skills and stimulate curiosity and can motivate their ability to increase the knowledge they have just gained. In addition, development research conducted by Yusuf (2017) shows that student learning outcomes increase, students are active in the learning process, and students are happy with the learning model used by the teacher. The achievement of indicators shows that the development of RPP-LKPD based on the Ber2P3 learning model in science learning has met the criteria for effectiveness. This is in line with research Batoq et al. (2015) which states that the effectiveness of learning devices aims to obtain an assessment of student activity and student learning outcomes on the use of learning devices developed (Hamilton et al., 2021; Susilawati et al., 2022; Tang et al., 2020). This indicator is to state that the learning device in this study is said to be effective.

Conclusion

RPP-LKPD based on the Ber2P3 learning model on Vibration and Wave material using the ADDIE development model has met the quality criteria which include 3 (three) aspects, namely aspects of validity, practicality and effectiveness. In the validity aspect, the results of the validation of the RPP-LKPD Based on the Ber2P3 Learning Model by 2 (two) validators obtained an average validation score of 3.7 and was in the "Valid" category with the description "can be used with minor revisions". In the aspect of practicality, the observation of learning implementation obtained an average percentage in the limited trial of 84% with the criteria "Good". Student responses obtained an average percentage in the limited trial of 80% with "Good" criteria. The results obtained indicate that the RPP-LKPD based on the Ber2P3 learning model developed is practical. On the effectiveness aspect, the observation of learner activity obtained an average percentage in the limited trial of 83% with the criteria "Good". Then for the learning outcomes test, students obtained classical completeness with an average of 84% with "Good" criteria. The results obtained indicate that the RPP-LKPD based on the Ber2P3 learning model developed is effective.

Author Contributions
All authors contributed to writing this article.

Conflicts of Interest
No conflict of interest.

References

Abdulrahaman, M. D., Faruk, N., Oloyede, A. A., Surajudeen-Bakinde, N. T., Olawoyin, L. A., Mejabi, O. V, Imam-Fulani, Y. O., Fahm, A. O., & Azeez, A. L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon*, *6*(11), e05312. https://doi.org/10.1016/j.heliyon.2020.e05312

Aini, N. A., Syachruroji, A., & Hendracipta, N. (2021). Pengembangan LKPD Berbasis Problem Based Learning pada Mata Pelajaran IPA Materi Gaya. *Jurnal Pendidikan Dasar*, *10*(1), 68–76. https://doi.org/10.21009/jpd.v10i1.11183

Ansyah, E., Pranata, Y., & Latipah, N. (2021). Pengembangan LKPD IPA berbasis problem based learning pada materi pencemaran lingkungan untuk siswa SMP kelas VII. *JPT: Jurnal Pendidikan Tematik*, *2*(3), 283–288. Retrieved from https://www.siducat.org/index.php/jpt/article/view/317

Batoq, I., Susila, I. W., & Rijanto, T. (2015). Pengembangan Perangkat Pembelajaran Model Kooperatif Tipe Jigsaw Berbasis Kurikulum 2013 Pada Mata Pelajaran Sistem Pendinginan Bahan Bakar Dan Pelumas Di Smkn 3 Sendawar. *Jurnal Pendidikan Vokasi: Teori dan Praktek*, *3*(2), 117–126. Retrieved from https://core.ac.uk/download/pdf/230746897.pdf

Bell, R., & Bell, H. (2020). Applying educational theory to develop a framework to support the delivery of experiential entrepreneurship education. *Journal of Small Business and Enterprise Development*, *27*(6), 987–1004. https://doi.org/10.1108/JSBED-01-2020-0012

Buchory, M. S., & Swadayani, T. B. (2014). Implementasi Program Pendidikan Karakter Di SMP. *Jurnal Pendidikan Karakter*, *5*(3), 235–244. https://doi.org/10.21831/jpk.v0i3.5627

Budiarso, A. S. (2017). Analisis Validitas Perangkat Pembelajaran Fisika Model Inkuiri Terbimbing untuk Meningkatkan Hasil Belajar Siswa SMA pada Materi Listrik Dinamis. *Jurnal Edukasi*, *4*(2), 15–20. https://doi.org/10.19184/jukasi.v4i2.5204

Chairunnisa, N., A., M., Ntobuo, N., & E. (2022). Pengembangan perangkat pembelajaran model kolaboratif Jire berbasis IT (Information and Technology) materi suhu dan kalor fisika. *Jurnal Ideas Publishing*, *8*(3), 805–812. https://doi.org/10.32884/ideas.v8i2.712

Faqiroh, B. Z. (2020). Problem-Based Learning Model for Junior High School in Indonesia (2010-2019.

Indonesian Journal of Curriculum and Education Technology Studies, *8*(1), 42–48. https://doi.org/10.15294/ijcets.v8i1.38264

Gaol, R. L. (2019). *Respon Siswa Terhadap Pengembangan Bahan Ajar Tematik Seklah Dasar berbasis Budaya Lokal Melalui Penerapan Model Contextual Teaching and Learning*. Retrieved from http://digilib.unimed.ac.id/39440/

Hafsah, U. M. S. U. (2017). Implementasi Riset Based Learning dalam Upaya Peningkatan Kualitas Pembelajaran. *Kumpulan Jurnal Dosen Universitas Muhammadiyah Sumatera Utara*, 8. Retrieved from http://jurnal.umsu.ac.id/index.php/kumpulandosen/article/view/1312

Hamilton, D., McKechnie, J., Edgerton, E., & Wilson, C. (2021). Immersive virtual reality as a pedagogical tool in education: a systematic literature review of quantitative learning outcomes and experimental design. *Journal of Computers in Education*, *8*(1), 1–32. https://doi.org/10.1007/s40692-020-00169-2

Mulyana, V., & Desnita, D. (2023). Empirical Validity and Reliability of the Scientific Literacy Assessment Instrument Based on the Tornado Physics Enrichment Book. *Jurnal Penelitian Pendidikan IPA*, *9*(5), 3961–3967. https://doi.org/10.29303/jppipa.v9i5.3290

Pakaya, S. Y. C., Dama, L., Hamidun, M. S., Nusantari, E., Baderan, D. W. K., & Katili, A. S. (2023). Development of Problem-Based Learning Modules on Environmental Pollution Materials to Improve Student Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, *9*(10), 7803–7809. https://doi.org/10.29303/jppipa.v9i10.4323

Pandey, P., & Pandey, M. M. (2021). *Research methodology tools and techniques*. Bridge Center. Retrieved from http://dspace.vnbrims.org:13000/jspui/bitstream/123456789/4666/1/RESEARCH METHODOLOGY TOOLS AND TECHNIQUES.pdf

Ramdani, A., Jufri, A. W., Jamaluddin, J., & Setiadi, D. (2020). Kemampuan Berpikir Kritis dan Penguasaan Konsep Dasar IPA Peserta Didik. *Jurnal Penelitian Pendidikan IPA*, *6*(1), 119–124. https://doi.org/10.29303/jppipa.v6i1.388

Sabara, A., Yusuf, F. M., Ahmad, J. N., E., & Lamangantjo, C. (2022). Validitas Perangkat Pembelajaran Berbasis STEAM Materi Struktur dan Fungsi Jaringan Tumbuhan untuk Meningkatkan Penguasaan Konsep. *Jambura Edu Biosfer Journal*, *4*(2), 76 – 85. https://doi.org/10.34312/jebj.v4i2.14734

Sujarwinanti, M., & Anshori, F. A. (2020). Pengembangan Alat Evaluasi Berbasis Aplikasi Android Pada Pokok Bahasan Sistem Eksresidi SMPN 2 BUA. *Jurnal Biogenerasi*, *5*(1), 33–49.

Retrieved from https://e-journal.my.id/biogenerasi/article/view/177

Sukardi. (2013). *Metodologi Penelitian Pendidikan: Kompetensi dan Praktiknya*. Jakarta: PT Bumi Aksara.

Supartini, K. W. (2021). Penerapan model pembelajaran direct learning untuk meningkatkan hasil belajar mata pelajaran food and beverage pada kompetensi menerapkan teknik platting dan garnish. *Journal of Education Action Research*, *5*(2), 194–199. https://doi.org/10.23887/jear.v5i2.33340

Sürücü, L., & Maslakci, A. (2020). Validity and reliability in quantitative research. *Business & Management Studies: An International Journal*, *8*(3), 2694–2726. Retrieved from https://www.bmij.org/index.php/1/article/download/1540/1365

Susilawati, S., Doyan, A., Mulyadi, L., Abo, C. P., & Pineda, C. I. S. (2022). The effectiveness of modern physics learning tools using the phet virtual media assisted inquiry model in improving cognitive learning outcomes, science process skills, and scientific creativity of prospective teacher students. *Jurnal Penelitian Pendidikan IPA*, *8*(1), 291–295. https://doi.org/10.29303/jppipa.v8i1.1304

Tang, Y.-M., Au, K. M., Lau, H. C. W., Ho, G. T. S., & Wu, C.-H. (2020). Evaluating the effectiveness of learning design with mixed reality (MR) in higher education. *Virtual Reality*, *24*(4), 797–807. https://doi.org/10.1007/s10055-020-00427-9

Wan, Z. H., Jiang, Y., & Zhan, Y. (2021). STEM education in early childhood: A review of empirical studies. *Early Education and Development*, *32*(7), 940–962. https://doi.org/10.1080/10409289.2020.1814986

Yusuf, B. (2017). Konsep dan Indikator Pembelajaran Efektif. *Jurnal Kajian Pembelajaran Dan Keilmuan*, *1*(2), 13–20. https://doi.org/10.26418/jurnalkpk.v1i2.25082