

## PRACTICALITY OF LEARNING DEVICES IN PROBLEM-BASED LEARNING IMPLEMENTATION IN CONTEXTUAL TEACHING AND LEARNING APPROACH

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**Abstract:** This study aimed to describe the practicality of physics learning tools with a problem-based learning model with a contextual teaching and learning approach. The research was conducted at Muhammadiyah Batudaa high school, and the research sample used was class XI using a simple random sampling technique. This development research uses the ADDIE model developed by Reiser and Mollenda, which consists of the analysis, design, development, implementation, and evaluation stages. The practicality test is carried out at the implementation stage. The results showed that the average percentage of the implementation of learning carried out for two meetings using a problem-based learning model with a contextual teaching and learning approach reached 97.619% with very good criteria. Then for teacher responses, 100% agreed through a teacher response questionnaire, and for student responses, 83% gave positive responses through student response questionnaires. In conclusion, physics learning tools that use a problem-based learning model with contextual teaching and learning approaches are practical to be applied in the physics learning process.

**Keywords:** *Contextual Teaching and Learning, Learning Tool, Problem Based Learning*

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### INTRODUCTION

Learning in the new normal is a condition where learning activities will be carried out face-to-face after a pandemic that resulted in online learning. Therefore, to prepare face-to-face learning conditions before the learning process, educators are expected to be creative in implementing teaching and learning activities so that in delivering material, students understand what is conveyed during the learning process.

The low quality of education influences student achievement. As seen in the international realm of student achievement, in 44 countries in the world, student achievement in Indonesia is only ranked 37th in the field of science according to Trends in Mathematics and Science Study (TIMSS) because children in Indonesia are only able to master approximately 30% of reading material. Based on the Decree of the Minister of Education and Culture No. 23/2016, it is explained that the teaching and learning process activities are in both basic and secondary education units. It is required to be stimulating, challenging, interactive, and fun. It can motivate students to be more active, initiative, productivity, and individual independence according to student's interests, talents, and development, both physically and psychologically [1].

The development curriculum in Indonesia is increasingly developing. The curriculum in Indonesia continues to change following the changing times, the development of science and innovation, community needs, and student knowledge insights. Regarding the changes in the 2013 revised education program, the purpose of education in Indonesia is to plan for Indonesian

individuals to have the capacity to live as people and as citizens who are loyal, profitable, inventive, imaginative, and emotional and can be actively involved both in the community, nation, and state, and countries, as well as world civilization. For this to be realized, it is necessary to implement the 2013 curriculum education program as a guide for learning in implementing learning in schools. Learning oriented to the 2013 curriculum is a competency-based learning concept by strengthening correct learning and evaluation forms to realize attitudinal, information, and skill competencies.

Physics is a learning material that contains reality, concepts, speculation, standards, and laws that discuss a general framework. The science that studies physics is physics. Physics must be based on logical discoveries that occur around [2]. Physics is one of the elemental sciences that deals with the properties, structure, and behavior of matter. Physics is a science that not only seems to contain speculations and equations that must be memorized, but physics requires an understanding of concepts centered on forming information through disclosing and introducing information [3]. Theories about physics are not enough to just read to study them because physics hypotheses are not just memorized but need to be understood and practiced.

The learning model is in the form of a conceptual design and framework that serves as an effort to provide direction to teachers in compiling and actualizing learning activities and serves for students to organize learning materials [4]. Good learning, if made in an organized and orderly manner in learning tools, can empower coherent

development considering talents and abilities in the form of numbers. Learning can be said to be good; it must also consider how students can obtain information, abilities, and mindsets. Learning that focuses on students' ability to obtain information through their actions are a Problem Based Learning (PBL) model. To make the learning process more practical, a teacher must be creative in presenting interesting learning. As educators, teachers are required to be more creative and innovative in determining the learning models and methods to be used.

Problem-based learning involves students explaining various problems by going through various stages of logical strategies so that students can retrieve information related to these problems. PBL learning can stimulate students' activities to find and respond to the information obtained by themselves, as well as build their knowledge to solve problems. The steps in PBL can direct students to find their knowledge through a coherent scientific method so that students are expected to be active during the teaching and learning process [5]. In the application of PBL learning, besides having advantages, there are also weaknesses. The characteristics of PBL are asking questions or problems and generating solutions to problems [6]. Problems in the learning process activities in the classroom will arise if, in solving the problem, the students do not conduct observations on a real event and do not make hypotheses. Investigation activities in solving problems will be easy to do if students can make temporary guesses from the problems that have been proposed. It is important because, in teaching and learning activities in physics, students are expected to be able to solve physics problems in real life around them. The activities of observing and submitting hypotheses are not found in the PBL syntax [7].

Effective education is education that involves abstract and concrete learning. An effort of teaching and learning activities that focuses on the learning process whose purpose is to encourage students to obtain learning materials independently through phenomena in their daily lives is learning that uses a contextual approach [8]. Contextual learning is one of student-centered learning, namely where students are stimulated to obtain subject matter independently. Learning which involves students in learning activities through their experiences and does not only focus on taking notes is Contextual Teaching and Learning (CTL). The concepts and principles of CTL learning refer to creating students who are both creative and critical. In CTL learning based on a predetermined topic on a material being taught, students can obtain material concepts independently. The students then correlate the concepts from experience gained in schools with the experience around them. Through the experience gained, the

material is perfectly attached to students' memories because students can understand the material that has been taught. The characteristics of CTL learning are being able to work together, build togetherness, create fun, not cause boredom, become energetic and interrelated, use different resources and develop dynamic students.

A learning process that uses the CTL approach is a learning concept that facilitates educators to connect the material being taught with the real experiences of students in everyday life. Students are encouraged to make connections and apply them to the knowledge gained in their life experiences [5]. Therefore, learning that uses the CTL approach in learning activities is not only an exchange of information between teachers and students. The concepts must be memorized, but a teacher is required to be able to encourage students to seek their abilities to live (life skills).

CTL learning is a learning strategy that allows students to understand the material taught through life experience by connecting the two according to the context [9]. Learning that connects material with real life is important to be realized in teaching and learning activities so that the information obtained is stored in the long term in memory so that the information obtained will be internalized and able to be connected in work life.

Contextual learning is a learning concept that connects the material being taught with conditions in the daily lives of students whose educators act as facilitators so that students are empowered to form associations with information obtained in real life [10]. Contextual learning can be a learning guide that emphasizes the maximum student mentoring method so that students can independently translate the material obtained from their life experiences [11]. The essence of contextual learning are: 1) Real World Learning; 2) real learning experience; 3) higher regulatory considerations; 4) students as learning centers; 5) dynamic, basic and imaginative student learning activities; 6) the information obtained is important information contained in daily life; 7) real-life oriented; 8) there is a change in student behavior; 9) students tend to hone rather than memorize; 10) the activity is learning but not teaching; 11) educate not teach; 12) forming human beings; 13) problem solving; 14) activities measure learning outcomes using different ways not only through tests [12].

The integration of the PBL and CTL models is the integration between some of the learning steps contained in the PBL model and some of the learning steps in CTL learning. Based on the advantages of CTL, which can cover the shortcomings in PBL and vice versa, it can create a learning experience that is quite interesting for students. The integration of this model will provide a learning experience for students always to

practice problem-solving activities that exist around students' lives constructively through a combination of the syntaxes found in Problem Based Learning and the syntax in Contextual Teaching and Learning. The Problem Based Learning learning model, in collaboration with the Contextual Teaching and Learning approach, is effective if applied in the learning process.

Everything that is used in helping teachers to carry out learning to achieve good learning objectives is a learning tool. In implementing teaching and learning activities, especially on physics material, the teacher starts by arranging physics learning tools based on the learning targets. The use of learning takes place properly as has been arranged to create students to be motivated in learning so that students can easily understand the material being taught. Educators in developed countries such as in the United States make learning tools for each learning topic to be taught, including 1) syllabus, 2) lesson plans, 3) teaching materials, 4) student worksheet, 5) learning media (minimum power point); 6) assessment of learning outcomes [13]. Based on the explanation that has been described, this study aims to describe the practicality of physics learning devices with a problem-based learning model with a contextual teaching and learning approach.

**RESEARCH METHODS**

This research is included in Research and Development (R&D) research. A learning device is said to be of high quality if it meets valid, practical, and effective criteria. Still, this study only focuses on describing the practicality of a physics learning device that uses a PBL learning model with a CTL approach. This study uses the ADDIE model developed by Reiser and Mollenda, which consists of the analysis, design, development, implementation, and evaluation stages.

The practicality test of a product in the form of learning tools is carried out at the implementation stage to see the practical level of learning using the developed learning tools. The practicality of learning devices was assessed using an assessment sheet on the implementation of learning, teacher response questionnaires, and student response questionnaires. The implementation will be carried out in class XI-IPA-1 SMA Muhammadiyah Batudaa in the odd semester of T.A 2022/2023 by determining the research subject using a simple random sampling technique.

The practicality of learning devices is seen from the observation sheet on the implementation of learning based on the lesson plans at each meeting. Aspects of the assessment by using the option that is implemented and not implemented. To determine the percentage of the implementation of all aspects of learning activities, use the formula:

$$\% \text{ Implementation of Learning} = \frac{\text{many steps taken}}{\text{planned number of steps}} \times 100\%$$

The assessment of the implementation of learning is carried out by matching the results of the sum of the average total scores with the learning implementation criteria, as shown in Table 1.

Table 1. Learning Implementation Criteria

Score	Criteria
81%-100%	very good/ very interesting/very suitable/very effective/ very practical
61%- 80%	good/attractive/appropriate/effective/practical
41%- 60%	moderate/fairly interesting/ fairly appropriate/quite effective/quite practical
21%- 40%	not good / less attractive / less suitable / less effective / less practical

Response questionnaires were given to teachers and students to determine teacher responses and student reactions regarding learning using the developed device. In this study, the response questionnaire instrument used a Likert scale; precisely, the respondents gave a score of 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree).

**RESULTS AND DISCUSSION**

The practicality of learning can be seen from the implementation sheet, which refers to the steps of the learning activities contained in the lesson plans, and can be seen from the teacher and student response questionnaire sheets.

**Implementation of Learning**

The implementation of learning in two meetings observed by observers during the learning process in the research carried out can be seen based on the sequence of the Learning Implementation Plan activities carried out on the topic of elasticity and Hooke's law. The percentage data from the learning implementation assessment sheet are presented in Table 2 [14].

Table 2. Implementation of Learning

Meeting	Performance Presentation (%)	Criteria
1	95.238	Very Good
2	100	Very Good
Average	97.619	Very Good

Table 1 shows that the percentage of the implementation of learning in its implementation for 2 meetings reached very good criteria. In Figure 4.1. it can be seen that the implementation of learning, meetings 1 to 2 have an overall average

value of 97.619% and obtain very good criteria [14].

**Teacher And Student Response Questionnaire**

The teacher response questionnaire sheet is given after the learning process for 2 meetings has been completed to see the teacher's response to the implemented learning tools. There are 5 indicators contained in the teacher response questionnaire sheet, including the teacher's response to the

syllabus, the teacher's response to the lesson plans, the teacher's response to teaching materials, the teacher's response to the student worksheet, and the teacher's response to the concept understanding learning outcomes test sheet. Then the 5 indicators are described in 104 statements with a score for each statement using a Likert scale. The results of the data from the teacher's response are presented in Table 3.

Table 3. Teacher Response Questionnaire Results

Indicator	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Syllabus	0	100	0	0	0
Lesson Plan	0	100	0	0	0
Teaching Materials	0	100	0	0	0
Student Worksheet	0	100	0	0	0
Study Result Test	0	100	0	0	0

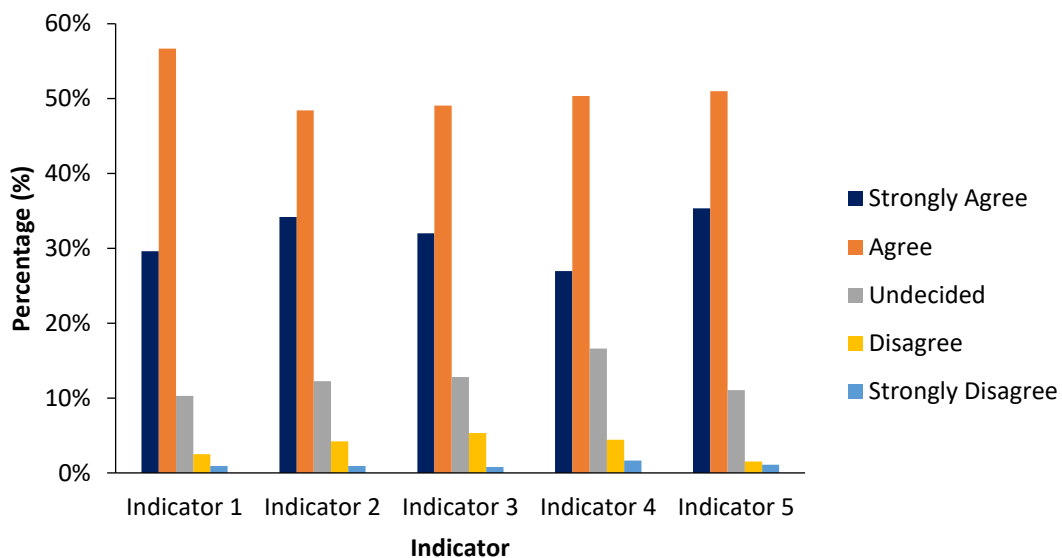


Figure 1. Percentage of Student Responses

Table 3. shows that the teacher response questionnaire results show that the teacher's response to all indicators obtains a 100% response of opinion agreeing to all components of the learning device developed. With this, it shows that based on the assessment of the physics subject teacher, the learning device has met the practical requirements for use in teaching and learning activities.

Giving student response questionnaire sheets after learning activities for 2 meetings have been completed to see student responses about learning using the learning tools made. There are 5 indicators contained in the student response questionnaire sheet, which include student responses about learning problem-based learning models, impressions obtained by students during

learning, students' feelings following problem-based learning, student responses to learning outcomes after participating in problem-based learning, and effectiveness of use student worksheet. The 5 indicators described are presented in the form of 25 positive and negative statements by scoring each statement using a Likert scale. The results of the data regarding student responses are presented in figure 1.

In Figure 1. The results of the student response questionnaire show that the majority of students (83%) gave positive responses about learning using the developed learning tools. Therefore, this shows that based on student responses regarding the learning carried out, it has met the practical requirements so that it can be implemented in teaching and learning activities.

The responses of teachers and students regarding learning using learning tools developed through response questionnaires received good responses. The response questionnaire was given after the learning activities for 2 meetings had been completed. Based on the teacher's response questionnaire, it can be seen that the teacher stated that the syllabus arrangement and the lesson plan were by the standards of preparation in the 2013 curriculum. Then the student worksheet was based on the fact that the activity steps were by the lesson plan made. Furthermore, regarding teaching materials, the teacher responds that the components that makeup teaching materials are basic competencies. For the last indicator, namely the learning outcome test based on the teacher's response, the learning outcome test is used according to the achievement of basic competencies [15-16]. With this, it shows that according to the assessment of the physics subject teacher, the product developed can be implemented in learning activities because it follows the practical requirements in its implementation.

Based on student responses regarding learning using the developed learning tools, most students stated that problem-based and contextual learning could make students concentrate, be comfortable, and be effective in the learning process. Students' impression that problem-based learning using a contextual approach makes students enthusiastic, active, and serious about studying elasticity and Hooke's law. Students feelings towards problem-based and contextual learning are fun so that they can eliminate boredom during the learning process [17-18]. Student responses regarding learning outcomes achieved in learning using learning tools developed stated that after participating in problem-based and contextual learning activities, students easily understood the material being taught and were able to answer questions. Finally, regarding the effectiveness of the use of student worksheets, most students stated that the use of problem-based and contextual worksheets could arouse students' curiosity and make it easier for students to understand the concept of elasticity and Hooke's law. Thus, most students responded well to the product developed so that it is feasible to implement.

The percentage of teacher responses regarding learning using learning tools is 100% agreeable. In comparison, the percentage of students who provide agreeable responses is 51%, and the percentage of students who give strongly agree responses is 32%. Thus the majority of students, 83%, responded that learning using products in the form of learning tools could be applied to teaching and learning activities with an explanation that problem-based and contextual learning activities can foster student enthusiasm. Based on positive responses from students and

teachers, it shows that using learning tools meets practical criteria if implemented in classroom learning. A positive response to the product is developed as a learning device so that it meets the practical criteria if implemented in physics learning activities [19-20].

## CONCLUSION

The problem-based learning model learning tools with the contextual teaching and learning approach on elasticity and Hooke's law are seen from the practicality of the implementation of learning. The average learning implementation percentage is 97.619% with very good criteria, 100% of teacher responses agree, and 83% of student responses in good categories. Therefore, the problem-based learning model learning device with the contextual teaching and learning approach is declared practical to be implemented in physics learning.

## REFERENCES

- [1] Kemendikbud. Lampiran Permendikbud Nomr 23 Tahun 2016 Tentang Standar Proses Pendidikan dan Menengah. Jakarta: Kemendikbud.
- [2] Utami, I. S., Septiyanto, R. F., Wibowo, F. C., & Suryana, A. (2017). Pengembangan STEM-A (science, technology, engineering, mathematic and animation) berbasis kearifan lokal dalam pembelajaran fisika. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni*, 6(1), 67-73.
- [3] Mahardika, I. K., Maryani, M., & Murti, S. C. (2021). Penggunaan Model Pembelajaran Creative Problem Solving Disertai LKS Kartun Fisika pada Pembelajaran Fisika di SMP. *Jurnal Pembelajaran Fisika*, 1(2), 231-237.
- [4] Suprihatiningrum, J. (2013). *Strategi Pembelajaran : Teori dan Aplikasi*. Yogyakarta: ARR RUZZ MEDIA.
- [5] Rusman. (2013). *Model-model pembelajaran: Mengembangkan profesionalisme Guru*. Edisi 2. Jakarta: Rajawali pers.
- [6] Arends. (2008). *Learning to Teach (Belajar Untuk Mengajar) Buku II*. Alih Bahasa oleh Helly Prajitno Soetjipto dan Sri Mulyanti Soetjipto. Yogyakarta: Pustaka Pelajar.
- [7] Wahyuni, D. (2014). *Efektivitas Implementasi Pembelajaran Model Problem Based Learning (PBL) Diintegrasikan dengan Predict-Observe-Explain (POE) Terhadap Prestasi Belajar Siswa Ditinjau dari Kreativitas dan Kemampuan Inferensi Siswa* (Doctoral dissertation, UNS (Sebelas Maret University)).
- [8] Sanjaya, Wina. (2007). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Jakarta: Kencana Prenada Media Group.

- [9] Rahayuningsih, N. T., Ashadi, A. T., & Sarwanto, S. (2013). Pembelajaran Biologi dengan Model CTL (Contextual Teaching And Learning) Menggunakan Media Animasi dan Media Lingkungan Ditinjau dari Sikap Ilmiah Dan Gaya Belajar. *Inkuiri*, 2(02).
- [10] Taniredja, Tukiran, dkk. 2015. *Model-model Pembelajaran Inovatif dan Efektif*. Bandung: Alfabeta.
- [11] Afriani, A. (2018). Pembelajaran Kontekstual (Cotextual Teaching and Learning) dan Pemahaman Konsep Siswa. *Jurnal Al-Mutaalimah: Jurnal Pendidikan Guru Madrasah Ibtidaiyah*, 3(1), 80-88.
- [12] Suprijono, Agus, (2014). *Cooperative Learning Teori & Aplikasi Paikem*. Yogyakarta: Pustaka Belajar.
- [13] Mawardani, A. (2015). Pengembangan Lembar Kerja Peserta Didik (LKPD) Thinking Acitivity Berbasis Penilaian Kerja Amali (PEKA) untuk keterampilan Hasil Belajar Materi Pokok Gerak Lurus Pesera Didik SMA. Yogyakarta: Universitas Negeri Yogyakarta.
- [14] Purnomo, B. (2017). Pengembangan Bahan Ajar Ilmu Pengetahuan Sosial Terpadu dengan Pendekatan Kontekstual pada SMP Kelas IX Semester I. *Jurnal Ilmiah Universitas Batanghari Jambi*, 14(2), 89-96.
- [15] Koltói, L. (2019). The relationship between school achievement and paternal involvement in children's school activities as judged by headmasters in the 2017 National Assessment of Basic Competencies (NABC). *Psychologia Hungarica Caroliensis*, 7(2), 190-212.
- [16] Suherman, A., Wiyono, A., Yayat, Y., Negara, R. M. H. K., & Berman, E. T. (2020, April). Enhancing student learning achievement using competency-based modules on basic competencies examining the characteristics of refrigerants and lubricating oils. In *IOP Conference Series: Materials Science and Engineering* (Vol. 830, No. 4, p. 042100). IOP Publishing.
- [17] Lestari, A., Setiadi, D., & Artayasa, I. P. (2021). Profile of student ability of science literacy in biology at the second grade of junior high school state in Mataram District Indonesia. *Jurnal Pijar Mipa*, 16(4), 486-491.
- [18] Nabilah, W., Sudiby, E., & Aulia, E. V. (2022). Foster student's science literacy skills on environmental pollution topics through the etnoscience approach. *Jurnal Pijar Mipa*, 17(3), 387-393.
- [19] Aini, Z., Ramdani, A., & Raksun, A. (2018). Perbedaan penguasaan konsep biologi dan kemampuan berpikir kritis siswa kelas X pada penerapan model pembelajaran kooperatif tipe group investigation dan guided inquiry di MAN 1 Praya. *Jurnal Pijar MIPA*, 13(1), 19-23.
- [20] Buhungo, T. J., Mustapa, D. A., & Arbie, A. (2021). Pengembangan perangkat pembelajaran team based learning-inquiry pada pembelajaran daring berbantuan whatsapp dan zoom meeting pada materi gerak lurus. *Jurnal Pendidikan Fisika dan Teknologi*, 7(2), 147-152.