Schrödinger: Journal of Physics Education
Vol. 4, No.2, June 2023, pp. 53~58
ISSN: 2716-1587, DOI: 10.37251/sjpe.v4i2.506

Contextual Learning Approach: Development of Worksheet in Physics Subjects

Wike Tio Wulandari[1]
[2]Department of Physics Eduaction, Universitas Jambi, Jambi, Indonesia

Article Info

Article history:

Received Apr 12, 2023
Revised Mei 18, 2023
Accepted Jun 13, 2023

Kata Kunci:

Contextual Learning
Elasticity and Hooke's Law
Worksheet

ABSTRAK

Research Objectives: The purpose of this study was to develop worksheets using a contextual learning approach in learning physics subject to elasticity and Hooke's law.

Methodology: This research includes research and development or Research and Development, Dick and Carey (2009) the steps are (1) Analysis of learning objectives; (2) Learning analysis; (3) Analysis of students and their environment; (4) formulate specific objectives; (5) Development of assessment instruments; (6) Development of learning strategies; (7) Develop and select learning materials; (8) Formative evaluation; (9) Revision; (10) Summative evaluation, but the authors limit it to the ninth step.

Main Findings: The results of this study are worksheets using the contextual learning approach to learning the physics of elasticity and Hooke's law which have been declared feasible by the validator. Based on the results obtained, it can be concluded that worksheets using the contextual learning approach in learning elastic physics and Hooke's law are well used as teaching materials for students in class X SMA/MA.

Novelty/Originality of Research: Integrating the values of everyday life is important to be integrated into learning, therefore, teachers are required to create learning innovations, such as worksheets based on everyday life.

This is an open access article under the CC BY-NC license

Corresponding Author:
Wike Tio Wulandari,
Physics Education, Universitas Masumus, Papua Selatan, Indonesia,
Jl. Kamizaun Mopah Lama, Rimba Jaya, Kec. Merauke, Kabupaten Merauke, Papua 99611, Indonesia
Email: wikew17@gmail.com

1. INTRODUCTION

Education is a very important element for life because with education, humans will become better individuals and can develop their potential. According to Jati, physics is a natural science with the scope of knowledge that exists in nature [1]. Physics is a branch of science that is very closely related to everyday life. Physics is part of the Natural Sciences (IPA), which is a systematic endeavor in the form of explanations that can be tested and are able to predict natural phenomena [2]. Physics is a science that studies objects that exist in nature, natural events and the interactions of objects in nature physically, and tries to formulate them mathematically so that they can be understood [3]-[5]. The application of the concept can be found in every aspect of life but the tendency of students is to memorize the theory, record information heard without understanding the concept and students are not able to make connections between known theory and its application. This can make students less developed so that many students say that physics is difficult to learn. And there are many formulas that are sometimes complicated and quite confusing. Therefore, in physics subjects it is necessary to have variations in learning methods, learning media and interesting teaching materials so that students are motivated in learning physics.

In the learning process, there are many media or teaching materials that can be used in learning. Hernawan divides learning materials or teaching materials into 2 forms, namely fully designed learning materials and incompletely designed learning materials [6]. One of the fully designed learning materials is the Student Worksheet (LKS). "LKS is a printed teaching material in the form of sheets of paper containing material, summaries, and instructions for implementing learning tasks that must be done by students, which refers to the basic competencies that must be achieved [7]. Meanwhile, according to Belawati "LKS is teaching material that has been packaged in such a way that students are expected to be able to learn the teaching material independently" [8]. LKS is an alternative teaching material that is good for students to become more independent and more active in the learning process so that instead of just receiving material from the teacher, students can find the concept of the material themselves. This is in accordance with the 2013 curriculum which emphasizes student-centered learning.

LKS needs to be developed with an approach, method or model so that it is more directed and structured because of the steps in learning. One that makes it easier for students to learn is the contextual learning approach. Learning with a contextual approach involves seven main components, namely constructivism, inquiry, asking, learning communities, modeling, reflection or feedback, and authentic assessment [9]. Contextual learning is a learning concept that helps teachers make connections between subject matter and students' real-world situations, and encourages students to make connections between the knowledge they have and its application to their daily lives [10]. Learning begins with taking (simulating, telling) events in the real world in everyday life experienced by students and then raised into the learning concepts discussed [11]. According to Suprijono contextual learning is an educational procedure that aims to understand the meaning of the subject matter they learn by relating it to the context of their own life in the social and cultural environment of society [12]. Contextual learning connects the material taught by the teacher with the real world in everyday life so that it makes it easier for students to understand the material. In addition, it can make students aware that what is learned is not just material, but has its application in everyday life. Previous research has been conducted by Fitriyati showing that this worksheet is able to increase student motivation in studying physics independently and online [13]. This worksheet gets student responses with good interpretation. In making worksheets based on a contextual approach, the author wants to develop worksheets using a contextual approach to the material of elasticity and Hooke's law. This material has many applications in everyday life, but the existing LKS does not yet contain this application.

2. RESEARCH METHOD

In learning the teacher must be good at choosing learning strategies. According to Setyosari, states that, "Learning strategies are related to the product or design that you want to develop" [14]. In developing a product, the author develops a product in the form of teaching materials in the form of worksheets, in preparing the worksheets the author uses a Contextual Learning approach.

In this research, the writer uses the Dick and Carey model. The Dick and Carey model contains detailed steps to produce a suitable teaching material for use in the learning process as well as outside the learning process. This model was chosen because of the clarity of each stage that is passed so that it can help researchers to produce quality teaching materials. As stated by Dick and Carey, these steps are (1) Analysis of learning objectives; (2) learning analysis; (3) analysis of students and their environment; (4) formulate specific objectives; (5) development of assessment instruments; (6) development of learning strategies; (7) develop and select learning materials; (8) formative evaluation, to state the feasibility of a product both theoretically and empirically [15].

One method of collecting data in research is using a questionnaire or questionnaire. According to Arikunto a questionnaire is a number of written questions that are used to obtain information from respondents in the sense of personal reports or other things the respondent wants to know [16]. The questionnaire in this study was a closed questionnaire. The evaluation questionnaire for teaching materials for design experts and materials experts is intended to find out whether the teaching materials made are feasible for research. Questionnaire evaluation of teaching materials for design experts is prepared based on aspects of visual communication. The design evaluation questionnaire consists of 12 indicators with alternative answers "Yes/No". The questionnaire for material experts is prepared based on aspects of learning design.

Table 1. Design Validation Assessment Questionnaire

Assessment Aspects	Indicator
Writing display	The title is written correctly.
	The size of the letters in the writing is appropriate.
	The color of the text is correct.
	The use of words is appropriate.
	The writing used is clear.
	The combination of the color of the text with the background is suitable.
Image display	The image colors match.
	Image size is correct.
	Compatibility of the image with the background.
	The variety of pictures is good.
Design	The consistency, format, organization, and appeal of the LKS are attractive.

The material evaluation questionnaire consists of 20 indicators with alternative answers "Yes/No". Design and material evaluation questionnaires were prepared based on the grid according to that proposed by Riantoni (2014).

Table 2. Content Validation Assessment Questionnaire Grid

Variable	Indicator	Descriptor
LKS Physics using the Contextual Learning approach	Content, construct and language	Suitability Convenience Accuracy Benefits

The feasibility of the LKS to be developed was assessed from the expert questionnaire and research subjects. According to Sugiyono the validity of an instrument shows the level of accuracy of an instrument to measure what should be measured [17].

3. RESULTS AND DISCUSSION

The preparation of worksheets using the Contextual learning approach on Elasticity and Hooke's Law material for high school physics learning uses the development model of Dick & Carey, through 8 stages, namely (1) Analysis of learning objectives; (2) learning analysis; (3) analysis of students and their environment; (4) formulate learning objectives; (5) development of assessment instruments; (6) development of learning strategies; (7) develop and select learning materials; (8) formative evaluation.

The results of validating the material aspects can be seen in table 3.

Table 3. Results of Material Aspect Validation of LKS

No	Statement	Validator I	Validator II	Comment
1.	Conformity of LKS material with syllabus	√	√	Valid
2.	Benefits of material to add insight	√	√	Valid
3.	The truth of the substance of learning material	√	√	Valid
4.	Ease to be understood by students	√	√	Valid
5.	The activity begins with a problem	√	√	Valid
6.	Explanation of the parts of the picture makes it easier for students to understand	√	√	Valid
7.	Work procedures in LKS make it easy for students to understand the material	√	√	Valid
8.	Description of the image in accordance with the steps presented	√	√	Valid
9.	Evaluation is presented in the form of a description to reveal students' thinking abilities	√	√	Valid
10.	Evaluation questions are adjusted to the work results that will be obtained by students	√	√	Valid
11.	The design (consistency, format, organization, and appeal) of LKS is attractive.	√	√	Valid

12.	Clarity of writing and pictures.	√	√	Valid
13.	Images are related and support the explanation of concepts.	√	√	Valid
14.	Clarity of the sequence of presentation of learning material	√	√	Valid
15.	Completeness of information in accordance with the material	√	√	Valid
16.	LKS legibility is clear	√	√	Valid
17.	The information contained in the LKS is clear	√	√	Valid
18.	Writing in accordance with the rules of the Indonesian language	√	√	Valid
19.	The language used is easy to understand	√	√	Valid
20.	The text used and the size are correct	√	√	Valid

Based on table 3 it is known that all validators have checked "yes" on all questions in the material and media assessment questionnaire, this means that the LKS does not need to be revised anymore.

The third design validation was carried out after the revision of the first validation was completed, the results of validating the design aspects can be seen in table 4.

Table 4. Results of the Validation of LKS Design Aspects

Assessment aspect	Indicator	Validator I	Validator II	Comment
Post View	Writing Title Is Appropriate	√	√	Valid
	The size of the letters on the writing is suitable	√	√	Valid
	Text Color Matches	√	√	Valid
	Use of the Word Is Appropriate	√	√	Valid
	The writing used is clear	√	√	Valid
	The color combination with the background is suitable	√	√	Valid
Image Display	Image Color Matches	√	√	Valid
	Image size is correct	√	√	Valid
	Compatibility of Image with Background	√	√	Valid
	Image Variation It's good	√	√	Valid
Design	The consistency, format, organization and appeal of the LKS are attractive	√	√	Valid

Based on table 4, it is known that all validators have checked "yes" on all questions in the LKS Design Validation Assessment questionnaire, this means that the LKS does not need to be revised again.

In the validation stage I, there were several suggestions and revisions from material experts and design experts for the worksheets being developed. After validating the stage I material, there are several suggestions given by material experts, namely related to sentences, instructions for completion, pictures, and Contextual Learning steps developed by the author.

First, in completing LKS students are not given instructions, for example to obtain an equation in solving it students must be given instructions so that students are not confused about solving it. Seeing from this, material experts suggest giving a little guidance to obtain an equation. Furthermore, in the LKS there are several monotonous pages containing only material and writing, there are no pictures related to material in everyday life. Therefore, material experts provide suggestions for adding images related to material in everyday life. Then, in the LKS there are also no Contextual Learning Steps so that the LKS made is still the same as the other LKS. Seeing this, material experts provide suggestions for including the steps of Contextual Learning in the LKS that the author has made.

In addition, there are several suggestions by design experts, namely those relating to size, color of writing for the cover and images on the cover. For the title on the cover the font size is still too small, and the font used is not the same. The color in the title box is too dark so the text cannot be read properly. Writing in English or foreign has not been written correctly. Seeing this, design experts suggest that the size of the letters in the title be written in a larger size, and the typeface used must be the same or uniform, and the background color

with the writing must be adjusted so that the writing can be read properly. Writing in a foreign language or English must be written in italics.

Then the images on the cover are still too small and there are several images that do not match the material. Seeing this, the design expert suggested enlarging the image and adjusting it to the size of the paper used. Whereas images that are not related to the material should be deleted and replaced with those related to the material.

After conducting phase II validation, there are several suggestions that must be revised from material experts, namely those related to Contextual Learning steps and information in worksheets. In the LKS developed by the author, not all of the Contextual Learning steps are included. That's why material experts suggest including all the Contextual Learning steps in the developed worksheets.

Then in the steps of Contextual Learning the inquiry section does not cover all of the inquiry parts themselves, where the inquiry parts are formulating problems, formulating hypotheses, collecting data, testing hypotheses, and giving conclusions. just. Seeing this, the material expert suggested that the inquiry section be supplemented by including all the parts of the inquiry.

The validator also gives suggestions that the color in the title box is still too dark, does not match the background color and has not included the curriculum used in developing worksheets. Seeing this, design experts suggest changing the background color, title box and including the curriculum used.

From the results of the validity of stage III, the developed LKS is feasible to use. Then the LKS can be tried out in schools to see how students perceive the developed LKS.

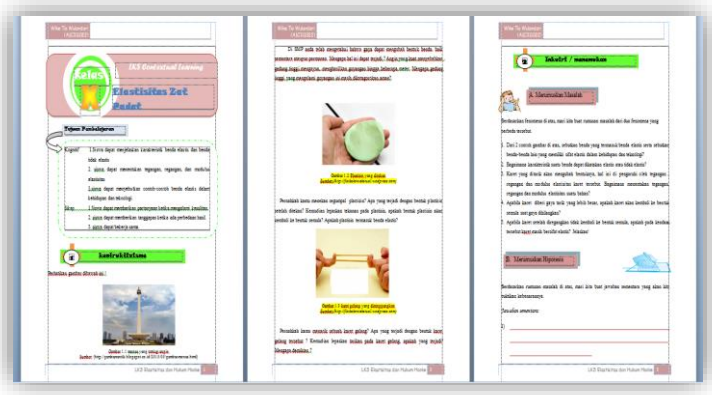

Figure 1. Material display design in worksheets after revision

4. CONCLUSION

Preparation of student worksheets using the Contextual learning approach on Elasticity and Hooke's Law material for high school physics learning using the Dick & Carey development model in the appropriate category to use.

ACKNOWLEDGEMENTS

The researcher would like to thank the stakeholders who have given permission for this research, as well as colleagues, so that this research has been completed.

REFERENCES

[1] Jati, B. M. E. *Pengantar Fisika 1*. Yogyakarta: Gadjah Mada University Press, 2013.
[2] Giancoli, D. C. *Physics: Principles with Applications*. United States of America: Pearson. 2013.
[3] Bao, L., & Koenig, K. (2019). Physics education research for 21st century learning. *Disciplinary and Interdisciplinary Science Education Research*, *1*(1), 1-12.
[4] Darmaji, D., Kurniawan, D. A., & Irdianti, I. (2019). Physics Education Students' Science Process Skills. *International Journal of Evaluation and Research in Education*, *8*(2), 293-298.
[5] Springuel, R. P., Wittmann, M. C., & Thompson, J. R. (2019). Reconsidering the encoding of data in physics education research. *Physical Review Physics Education Research*, *15*(2), 020103.
[6] Hernawan, Assep Herry, *Pengembangan Bahan Ajar.* Bandung: UPI, 2010.
[7] Prastowo, Andi. *Panduan Kreatif Membuat Bahan Ajar Inovatif*. Yogyakarta: Diva Pers, 2011.
[8] Belawati, T., Sadjati, I.M., Andayani.., Julaeha, S., Pannen, P. *Pengembangan Bahan Ajar*. Jakarta: Universitas Terbuka. 2007.

[9] Sanjaya, *Strategi Pembelajaran berorientasi Standar Proses Pendidikan*. Jakarta: Kencana Prenada Media Group, 2006.
[10] M. Masnur. *KTSP Pembelajaran Berbasis Kompetensi dan Kontekstual*. Jakarta: Bumi Aksara, 2011.
[11] Tantri, *Pengembangan Perangkat Pembelajaran Berbasis Kontekstual Pokok Bahasan Turunan di Madrasah Aliyah Negri 3 Palembang. Jurnal Pendidikan Matematika*, vol. 3, no. 1, pp.7-14,2009.
[12] Suprijono, Agus. *Cooperative Learning Teori Dan Aplikasi PAIKEM*. Yogyakarta: Pustaka Belajar, 2013.
[13] Fitriyati. *Pengembangan LKS Fisika SMA Kelas X Semester II dengan Website Online Berbasis Contextual Teaching Learning*. Jurnal Pendidikan *FKIP UMP*. Purworejo: UMP. 2013.
[14] Setyosari, Punaji. *Metode Penelitian Pendidikan dan Pengembangan Ed. 2*. Jakarta: Kencana Prenada Media Group, 2012.
[15] Dick, W., Carey, L., Carey. J. O. *The Systematic Desaign Of Instruction*. Ohio: Pearson, 2009.
[16] S. Arikunto. *Dasar-dasar Evaluasi Pendidikan (Revisi)*.Jakarta: Bumi Aksara, 2010
[17] Sugiyono. *Metode Penelitian Pendidikan Pendekatan Kuantitatif,Kualitatif, dan R&D*. Bandung: Alfabeta, 2013.