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Development of CTL-approached Students Activity Worksheet in Environmental Change Learning Material to Increase Students' Learning Outcome

Mila Nur Syarifah[1]✉, Retno Sri Iswari[1]

[1]Biology Department, Faculty of Mathematics and Natural Science, Universitas Negeri Semarang, Indonesia

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Abstract

The innovation of student activity worksheet is one of the alternative ways to complement teaching materials in 2013 curriculum. The learning process will be more meaningful if the student activity worksheet used raises contextual material. The purpose of this study is to analyze the feasibility and practicality of CTL-approched student activity worksheet in environmental change material as one of the teaching materials in the learning process. The research method used in this study is a modified Research and Development (RnD) by Sugiyono (2015). The instruments used in this study are validation sheet by material and media experts, student activity worksheet readability questionnaire sheet by students, practicality questionnaire sheet by teacher & students, and interview guidelines. The validity of the material obtains a score of 82.14% with very Feasible criteria and it shows the suitability of the material presented with the CTL approach. The validity of the media obtains a score of 94.6% with very valid criteria and it shows the suitability of the graphic and language aspects. The results of the readability test by students shows a score of 75.2% with Feasible criteria. The result of the practicality assessment of student activity worksheet by teacher reaches a score of 95.83% with very practical criteria and by students reachs a score of 76.23% with practical criteria. Based on the research results, it can be concluded that the developed-CTL-approched student activity worksheet is very feasible and practical to use in learning process.

✉ Correspondence Address:
D6 Building 1st Floor Jl Raya Sekaran Gunungpati Semarang
E-mail: milanursyarifah27@gmail.com

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INTRODUCTION

Science has a very strategic role for future life, especially in preparing students' future who have to think critically, creative, competitive, able to solve problems and dare to make decisions quickly and accurately, so that they will be able to survive productively amid the swift waves of global-digital-era competition which is full of opportunities and challenges (Sudarisman, 2015). The 21st century requires strong human resources in the field of science (Sadiqin*et al.*, 2017) which includes biology (Kurnia and Suryadarma, 2016). Recognizing the complexities of the future, the UNESCO's commission for education (Commission Education for the "21" Century) recommends 4 pillars of education that can be used as education bases, including: 1) learning to know, 2) learning to do, 3) learning to be, 4) learning to live together.

Science is a study that cannot be separated from various components of nature, whether in the form of phenomenon, behavior, or characteristic creat a concept which must use scientific method to study it. The process of learning science does not only take place by providing material in the classroom but rather emphasizing the providing of direct experience to learn and explore the natural surroundings so that it is expected to improve the competence of the students.

One of the biological materials contained in the 2013 curriculum for class X of high schools is environmental change (climate) and waste recycling. This material is one of the materials in biology subject which its principle is closely related to the environment around where students live or study. Based on the observations at MAN 03 Cilacap, the learning process undertaken by teachers on environmental change material is still monotonous and does not apply a variety of innovative strategies and learning approaches that have been determined in the 2013 curriculum, so that the understanding of science and the level of enthusiasm of the students in learning about environmental change material less than optimal. In addition, the learning resource used by the teacher in the learning process for environmental change is in the form of student activity worksheet (LKPD) that have been provided by the school. However, the content presented in the student activity worksheet is still very theoretical and does not provide concrete problems that can spur students' curiosity, so that the learning process is not based on the experience and information seeking to improve students' learning outcome. The learning outcome of class X students on environmental change material is still low and does not reach the minimum completeness criteria (KKM). This is indicated by the average of students' daily test scores. Students who get score above the KKM (≥70) are only 44.12% (15 of 32 students), and those who do not reach the KKM (≥70) are 50% (17 of 32 students).

Learning activities on this environmental change material can be carried out in the classroom in the form of discussions that are oriented towards problems of daily life, and exploration activities can also be carried out regarding environmental problems as supporting activities in the learning process. These problems can be explored by directly observing objects around the school, community environment and the environment where students live, so that the learning process is not monotonous and students can be actively involved in learning activities and participate to participate in repairing damage environment. Thus, in the learning process the teacher must use contextual innovative teaching materials so that the students can gain direct learning experience and improve students' learning outcomes. One of the contextual teaching materials is to develop CTL-approched students activity worksheets, especially for environmental change material. Students' activity worksheets (LKPD) contain assignments that must be done by students so that they are suitable for use as teaching material to improve students learning outcomes because through the student's activity worksheet (LKPD), they are encouraged to be more active in discovering their own concepts and knowledge. Meanwhile, CTL learning requires teachers to present the real world into the classroom and encourage students to make connections between their knowledge and its application in their daily lives (Fausan&Pujiastuti, 2017). Based on the observation results in the environment around MAN 03 Cilacap, there are found many facts and problems regarding to the environment (ecology) both support and damage of the environment, which can be explored (such as waste from tofu craftsmen, waste from the coal-fired power plant industry, waste from the biodiesel industry

(Pertamina)), inorganic waste, and so on) which can be used as teaching materials for environmental change materials for class X SMA level, so that students can learn contextually according to the demands of the 2013 curriculum

The purpose of this research is to analyze the feasibility of LKPD with CTL approach on environmental change material according to the expert and Analyzing the practicality of the CTL approach to material of environmental change as one of the teaching materials in the learning process. Based on the descriptions that have been submitted as the basis for the development of CTL-approached student activity worksheet on environmental change material to improve student learning outcome at MAN 03 Cilacap. The use of LKPD is contextual, it is expected to improve student learning outcomes.

RESEARCH METHOD

The method used in this study is the RnD (Research and Development) method. The research steps in this research are based on Sugiyono (2015), namely 1) initial observation (potential and problems), by interviewing biology teacher at MAN 03 Cilacap and observing the environment around the school; 2) data collection; 3) product design; 4) product design validation, by validating LKPD by material experts and media experts using a validation questionnaire; 5) revised product design; 6) small-scale trials, by conducting LKPD legibility test by students through distributing student questionnaires; 7) product revision I; 8) LKPD practicality test, by providing practical assessment questionnaires for biology teacher and students. The instruments used in this study are interview guidelines, media expert validation sheet, material expert validation sheet, student worksheet readability questionnaire, teacher practicality questionnaire, and practicality questionnaire sheets by students

The subject of this study are 10 students of class X IPA 1 of MAN 03 Cilacap in the academic year 2020/2021. The assessments analyzed in this study are the feasibility and the practicality of the LKPD. The feasibility of the LKPD is obtained from the validity value of the LKPD by material experts and media experts as well as the readability value by students. The LKPD's validity criteria by experts can be seen in table 1 as follows.

Table 1 validity criteria by experts

Percentage rate (%)	**Criteria**
76-100	Very Feasible
51-75	Feasible
26-50	Less Feasible
0-25	Not Feasible

While the LKPD readability criteria by students can be seen in table 2 as follows.

Table 2 LKPD readability criteria by students

Percentage rate (%) (%)	**criteria**
76-100	Very Feasible
51-75	Feasible
26-50	Less Feasible
0-25	Not Feasible

The practicality of LKPD is obtained from the practicality assessment by biology teacher and students through practicality sheet. LKPD practicality criteria can be seen in table 3 as follows.

Table 3 LKPD Practical Criteria

Percentage (%)	**Practical criteria**
80-100	very practical
66-79	practical
55-65	Rather practical
40-55	less practical
30-39	Not practical

(Arikunto, 2018)

RESULTS AND DISCUSSION

The results and discussion in this study include the feasibility and practicality of CTL-approached LKPD in learning process.

1. Feasibility of CTL-approached LKPD in Environmental Change Material

The data used to determine the feasibility of the LKPD are the validity of the CTL-approached LKPD by material and media experts, and the readability of the LKPD by students. The development of the CTL-approached LKPD is validated by two experts, they are an expert lecturer in the field of media and an expert lecturer in the field of material, especially material related to the environment. The carried-out validity test is based on the aspects and criteria for assessing teaching material in accordance with BSNP standard.

The validity of the CTL-approached LKPD is seen from the aspects of content and presentation feasibility. The validity data of CTL-approached LKPD by material expert obtained are presented in table 4 below.

Table 4 the validity of CTL-approached LKPD by material expert

No.	Validity	Aspect			
		Content validity		**Validity of presentation**	
		score	**%**	**score**	**%**
1.	Material Validator	24	85,71	22	78,5
Total score		46			
Total Percentage		82,14%			
Criteria		Very Feasible			

Based on the evaluation from the material validator, it is known that the result of the evaluation of the validity of the CTL-approached LKPD with very Feasible criteria. Material expert validation is carried out to assess the suitability of the material with the competency standard and basic competency contained in the syllabus and in accordance with the characteristic of students (Tinja*et al.*, 2017). The assessment aspects presented in the material validation that have been modified from BSNP, (2014) include aspects of content and presentation feasibility. The indicators contained in the aspect of content feasibility include: 1) material coverage, 2) accuracy of material, 3) up-to-date material and 4) skills. While the indicators contained in the aspect of presentation feasibility are: 1) presentation technique, 2) supporting material presentation, 3) presentation of learning activity.

The preparation of the content of LKPD has been adjusted to the 2013 curriculum guidelines. One of the learning approaches developed in the 2013 curriculum is the CTL approach. Every learning activity in the CTL-approached LKPD is arranged based on CTL learning steps. Contextual LKPD is very suitable for use in learning, because the presented material is more factual, beside the fuctual presented material it also it requires students to find their own knowledge. This is also in line with Perwitasari*et al.*, (2018) which state that contextual learning combined with students' thinking styles is very effective in achieving learning goals. Hobri*et al.*, (2018) also states that CTL is a learning approach where students learn to connect learning material with real situations so that the knowledge they achieve can be meaningful. The CTL approach is a way to present learning material by exposing problems related to daily life that must be resolved by students to achieve educational goals (Dewi&Primayana, 2019). By applying context in learning, students can communicate and share ideas, as well as experience it themselves and work together to solve problems (Hasruddin *et al.*, 2015). LKPD with CTL approach is considered to have reached very Feasible criteria by material experts, with suggestions and input giving a bold or italic effect to the word "except" and avoiding conjunctions at the beginning of the question sentence.

The validity of the CTL-approached LKPD is seen from the aspects of graphic and language feasibility. The data on the validity of the CTL-approached LKPD by media expert is presented in table 5.

Table 5 the validity CTL-approached LKPD by media expert

No.	Validity	Aspect			
		Advisability graph		**Language Advisability**	
		Score	**%**	**Score**	**%**
1.	Validator Media	25	89,28	28	100
Score Total		53			
Percenntage Total		94,6%			
Criteria		Very Feasible			

Based on the assessment of the media validator, it is known that the results of the evaluation of the validity of the CTL-approached LKPD reaches with very Feasible criteria. Media expert validator helps validating the accuracy in designing teaching materials (Suparti, 2015) so that if there are parts of teaching materials that are not quite right it can be fixed again (Nafiah *et al.*, 2019). The validation of the CTL-approached LKPD by media expert is assessed from several aspects based on the BSNP (2014) assessment criteria, namely aspects of the graphic and language eligibility. The indicators presented in the aspect of

graphic feasibility include: 1) LKPD cover and 2) LKPD content. While the indicators presented in the aspect of language feasibility are: 1) language according to the level of development of high school students, 2) readability, 3) straightforwardness, 4) coherence, 5) conformity with PUEBI and 6) conformity with scientific / foreign writing rules.

In this LKPD, the illustrated images presented are taken from the environment around MAN 03 Cilacap, the internet, and from journals. Images that come from the environment (especially around MAN 03 Cilacap), will attract more attention and interest from students to learn because the problems presented are dominant / closer to the daily lives of students. Images that come from journals have a more real impression because the problems presented are the result of a study by other authors. While images sourced from the internet can provide additional information that is not found in the environment around MAN 03 Cilacap or from journals. Pambudiono*et al*., (2016), explain that biology-related learning is full of images to explain structure and process, so biology without pictures will not provide a good understanding for those who learn it. In addition, in his research, Situmorang (2013) also explains that a good textbook must be able to motivate learners by utilizing interesting things such as pictures, illustrations, examples of questions (cases), have sufficient material to support teaching, and can be used for support problem solving activities.

The aspect of grammar and language assessment conducted by the media validator also shows a positive response, which is marked by an average score of each point of 4, with the assessment that the language used is in accordance with the level of thinking development of high school students, the sentence structure used is correct, the terms used are standard, the grammar used is correct, and the writing of scientific / foreign names is also correct. Pambudiono*et al*., (2016), state that textbook authors need to pay attention to the effective form in using language, minimizing the use of foreign words, short words that are not suitable, or sentences that are too long. Learning process will run well if the language used is clear and easily understood by students (Wati*et al*., 2015). In addition, the developed LKPD also fulfills elements including the title, table of contents, instructions for using LKPD, concept maps, indicators, learning objectives, and motto that can motivate students to learn. According to Oktaviana*et al*., (2015), well-packaged teaching materials makes readers become more interested in reading and learning. Although the design of the LKPD is very Feasible by media expert. However, improvements are still needed in terms of adding to the use of original images from the surrounding environment that are contained in the LKPD cover and the contents of the LKPD.

After LKPD validation by material and media experts, then a small-scale test is carried out with the aim of providing an assessment of the readability of the CTL-approached LKPD on environmental change material. The results of the CTL-approached LKPD readability assessment are presented in table 6 as follows.

Table 6 the Results of CTL-approached LKPD Readability Test by students

No.	Statement	Total score	Maximal score	Percentage (%)
1.	Is the LKPD cover design attractive?	10	13	77
2.	Is there a connection between the LKPD's cover title and the illustration on the cover?	10	13	77
3.	Does the cover's background color contrasts with the text and illustration images?	9	13	69,23
4.	Are the images presented in the LKPD attractive?	10	13	77
5.	Is the font / typeface appropriate and easy to read?	8	13	61,53
6.	Is the language used in the LKPD easy to	10	13	77

	understand?			
7.	Does the language used in LKPD use standard terms?	10	13	77
8.	Is the scientific / foreign writing correct?	10	13	77
9.	Is the content of the material presented in the LKPD easy to understand?	10	13	77
10.	Are learning activities in LKPD presented systematically?	10	13	77
11.	Have you ever encountered the material and examples of environmental change events presented in the LKPD in your daily life?	10	13	77
12.	Does the LKPD's display can increase learning motivation?	10	13	77
13.	Are the observation and discussion guidelines in the LKPD easy to understand and implement?	10	13	77
	Percentage average (%)			**75,2%**
	Criteria			**Proper**

Based on the data from the results of the of CTL-approached LKPD readability assessment by 10 students with appropriate criteria. LKPD is said to be feasible if the result of the readability assessment by students reaches an average score of ≥ 51% with criteria proper to very feasible. The LKPD readability assessment is carried out by giving a readability questionnaire to 10 students, after the students read and scrutinize the develpped-CTL-approached LKPD.

The LKPD readibility test results are also same to the results of the LKPD validity obtained from the assessment of material and media experts which show positive results. LKPD is declared very Feasible to be used in learning, so that these results also affect the results of the LKPD readability test. This is the LKPD has been prepared in accordance with applicable regulations and passed the improvements in accordance with the advice given by the expert.

Based on the results of the feasibility analysis of the CTL-approached LKPD approach on environmental change material, the results of validation by material expert, media expert validation, and LKPD legibility test there are obtained average percentage of 82.14% (with very Feasible criteria), 94.6 % (with very Feasible criteria), and 75.2% (with eligible criteria). From the three assessments, it can also be seen that each assessment has reached a mean score of ≥ 51%. This shows that the developed-CTL-approached LKPD is feasible to be applied in learning process.

2. Practicality of CTL-approached LKPD in Environmental Change Material

LKPD practicality assessment is carried out by biology teacher and 10 students of class X MAN 03 Cilacap which is conducted randomly. The practicality assessment of the LKPD is carried out by providing a practical response questionnaire to biology teacher and students after reading and observing the LKPD that has been provided. The following is the data of the practicality assessment result of the CTL-approached LKPD by biology teacher presented in table 7.

Table 7 the Results of Practical Assessment of CTL-approached LKPD by Biology Teacher

		Aspect							
No.	**Validity**	**Usefullness**		**Display**		**Interaction**		**Contentment**	
		Score	**%**	**Score**	**%**	**Score**	**%**	**Score**	**%**
1.	Validator Media	16	100	11	91,6	11	91,6	8	100
Total score		46							
Percentage Average		95,83%							
Criteria		Very practical							

Based on table 7, it can be seen that the total percentage value of the practicality of the CTL-approaced LKPD by biology teacher with very practical criteria. While the data on the results of the practicality assessment of the CTL-approached LKPD by students are presented in table 8 as follows.

Table 8 Results of the practical assessment of the student worksheet approaching CTL by students

Aspect	**Statement**	**Total Score**	**Max. Score**	**Percentage (%)**
Usefulness	1. 1. Students easily understand the material of environmental change, because the problems raised in the LKPD are factual	33	44	75
	2. 1. This LKPD can train the skills of students	32	44	72,72
	3. 1. This LKPD can develop scientific attitudes and arouse students' interest in the natural surroundings	34	44	77,27
	4. 1. This LKPD can make students active in learning activities	33	44	75
Display	1. 1. LKPD cover can attract the attention of students to learn the material	32	44	72,72
	2. 1. Illustrative pictures of each activity in LKPD is clear and attractive	32	44	72,72
	3. 1. The contents of the LKPD use clear and clear font sizes and types	34	44	77,27
Interaction	1. 1. Activities contained in the LKPD can increase the interaction between students.	35	44	79,54
	2. 1. Activities contained in the LKPD can increase the interaction between students and teachers	36	44	81,8
Independent learning	1. 1. Activities contained in this LKPD train the independence of students in learning	30	44	68,18
	2. 1. Activities contained in this LKPD encourage students to explore	38	44	86,36
Percentage average (%)				**76,23%**
Criteria				**Practical**

The practicality assessment carried out by students also showed a positive response in every aspect, So that the assessment by 10 students obtained practical criteria. LKPD is said to be practical if the result of the practicality assessment of LKPD by both teacher and students reach ≥ 66% or the criteria are practical

to very practical. The component of the LKPD practicality test assessment refers to the research of Rochman *et al*. (2015) which have been modified, including: a) practicality tests by biology teachers include: 1) usefulness aspect, 2) display aspect, 3) interaction aspect, and 4) contentment aspect. Meanwhile, b) practicality tests by students include: 1) usefulness aspect, 2) display aspect, 3) interaction aspect, and 4) independent learning. Practical assessment conducted by teachers and students shows a positive response in every aspect. According to Hestari*et al*. (2016), learning media is said to be practical related to whether or not the media is easy to use. However, even though the CTL-approached LKPD has been declared practical, there are still improvements that must be made which refer to the suggestions and input from the biology teacher, namely regarding errors in writing upper and lowercase letters, for example in the sub-chapter there is a title that is not properly capitalized.

CONCLUSION

The LKPD with the Contextual Teaching and Learning (CTL) approach developed is very suitable for use in learning environmental change material in SMA. Based on the assessment by material experts, a percentage of 82.14% was obtained with very feasible criteria, an assessment by media experts obtained a percentage of 94.6% with very feasible criteria, and the assessment of the readability test in small-scale trials by students obtained an average percentage amounted to 75.2% with proper criteria. So that the total average percentage obtained from the feasibility test is 83.98% with very feasible criteria.

The LKPD with the Contextual Teaching and Learning (CTL) approach which was developed is very practical to be used in learning environmental change material in SMA. Based on the practicality assessment of the LPKD by the biology teacher of MAN 03 Cilacap, a percentage of 95.83% was obtained with very practical criteria, while the LKPD practicality assessment by students obtained a percentage of 76.23% with practical criteria. So that the total average percentage obtained from the practicality test is 86.03% with very practical criteria.

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