

Application of Integrated E-Handout Problem Based Learning Model to Improve Students' Creative Thinking Skills

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A BSTRACT

This research is classroom action research with the aim of improving students' creative thinking skills through the application of integrated E-handouts with the PBL model. The PTK mode used is the Kemmis-Mc spiral model. Taggart. The PTK model consists of 4 stages, including planning, acting, observing and reflection. This research was carried out over two cycles. Each cycle consists of two meetings. The research results from the first cycle to the second cycle showed an increase in students' creative thinking skills from an average of 70.97 to 81.25. So that students' knowledge competency also increases. In the first cycle, the average was 70.19 with classical completeness of 11.11%. Meanwhile, in the second cycle, the average knowledge competency obtained was 82.25 with classical completeness of 80.55%. This shows that the application of integrated E-handouts in the PBL model can improve students' thinking skills and knowledge competencies.



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I NTRODUCTION

21st Century Learning is learning that requires students to master the 4C skills, namely critical thinking skills, communication skills, collaboration skills, creative thinking skills and innovation. This is in line with the Pancasila student profile in the free learning curriculum to produce students who are faithful, devoted to God Almighty and have noble character, global diversity, independence, mutual cooperation, critical reasoning and creativity. Apart from that, 21st century learning requires students to be able to develop talents, interests and potential (Husniyah et al 2022). The goal is to become a human being with character and competence and mastering technology (Husniyah & Asrizal, 2021). This is in accordance with the intense competition for human resources globally in the 21st century (Indarta, et al, 2022). In 21st century learning, it is hoped that it will produce human resources with superior value (Asrizal & Amran, 2018) . Therefore, with the independent learning curriculum, it is hoped that the demands of 21st century learning can be realized.

The independent learning curriculum is a curriculum that gives students the freedom to know themselves so that learning becomes fun. In line with Ki Hajar Dewanagara's thoughts, independence means being free from fear and freedom of thought (Savitri, 2020). This is in line with Kurniati that the independent learning curriculum is a curriculum with intra-curricular learning (Kurniati et al, 2022). So that students have time to master concepts and strengthen competencies (Lie, 2022). Apart from that, with intracurricular learning, learning can be maximized for students (Bagja, 2022). The independent learning curriculum creates a generation of lifelong learning with a Pancasila spirit (Rahayu, et al, 2022). For this reason, a teacher is needed who acts as the main subject and becomes a driving force so that he is able to direct and support students towards positive things (Yamin & Syahrir, 2020). So, by having teachers as drivers of the independent learning curriculum, it is hoped that the intracurricular learning carried out will be carried out well in accordance with the objectives expected in the independent learning curriculum which is in line with the demands of the 21st century.

One of the hopes for 21st century learning that is in line with the independent learning curriculum is to produce students who think creatively. However, the reality in the field is that students' creative thinking skills are still low. This is in accordance with the data obtained through the question instrument, namely the results of students' creative thinking in class E8, namely 48.33 in the quite creative category. These data show that the creative thinking skills of students in class E8 need to be improved further. This condition causes students' knowledge competency to remain low. The low creative thinking skills of students are caused by not maximizing students' ability to think actively in solving every problem presented in the learning process (Fahmi, 2021). The average student in Indonesia is only able to recognize a number of facts, without being able to relate and communicate various topics to each other (Af'idayani, 2018; Rahayu, 2018)). For this reason, an alternative solution that can be used is the application of integrated E-handouts with the PBL model to improve students' creative thinking skills.

Teaching materials are material guides that guide students to learn. This is in line with Prastowo's statement that teaching materials are a set of materials that are arranged systematically to create an atmosphere for students to learn (Prastowo, 2019). Teaching materials consist of printed and non-printed teaching materials. E-handouts are one of the non-printed teaching materials that make it easier for students to access materials anywhere in accordance with the needs of the 21st century. Because electronic-based handouts (E-handouts) are easy to carry anywhere and do not require a large storage space (Asiyani, 2019) . Apart from that, E-Handouts are interactive because they can combine images, animation, text and video (Jazuli, et al 2017).

The model used in the E-handout is the problem based learning (PBL) model. This model is one model that is in line with the implementation of the independent learning curriculum. The PBL model can realize innovative and creative learning in learning (Mawarsari & Wardani, 2022). Apart from that, based on previous research, the PBL model improves communication and learning achievement of students (Putri, et al, 2015. Second, it can improve students' creative thinking skills (Pusparini, et al, 2018) . This is also in line with Handi's research, it can improve skills. creative thinking and students' understanding of concepts (Herdiawan et al, 2019). Third, it can improve students' learning outcomes (Jannah & Khikmiyah, 2020).

Previous research related to integrated PBL model teaching materials only had an influence on student activities and learning outcomes. This is in line with Fatimatul's research that PBL-based live web worksheets can increase student activity [20]. Apart from that, this research is also in line with Miftaql, that PBL based on E-worksheets can increase students' activities and learning outcomes (Jannah, 2020). The research objective of implementing the integrated e-handout PBL model is expected to improve students' creative thinking skills and knowledge competencies.

METHOD

The research design used in this research is Classroom Action Research (PTK). This Classroom Action Research (PTK) was carried out in February 2023 in Phase E.8 Class of SMA N 3 Padang, totaling 36 students. The research consisted of two cycles, namely cycles 1 and 2. Each cycle consisted of two meetings. So the number of meetings in both cycles was four meetings.

The research model used is the Kemmis-Mc spiral model. Taggart. In the PTK model, each cycle consists of 4 stages. These stages include planning, acting, observing and reflection (Trianto, 2011). The use of this model is a repeatable, continuous cycle model that shows improvement. This can be achieved by improvements made in each cycle.

At the planning stage, it is based on the results of initial observations which include the learning applied, the learning tools used and the student creativity assessment sheet instrument. The next stage is carrying out learning using PBL integrated e-handouts together with the third stage. Meanwhile, at the reflection stage, discussing the problems and obstacles encountered in implementing the action. The following are the stages of Kammi and Mc's PTK Spiral Model. Taggart in figure 1

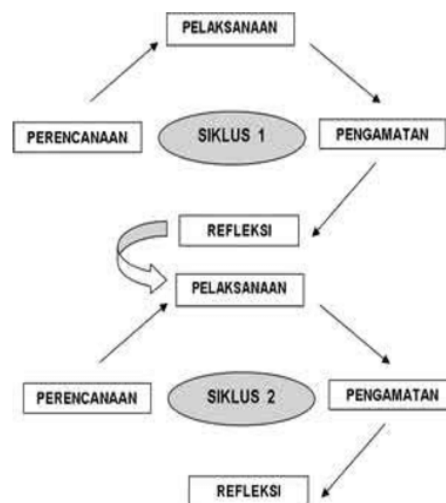


Figure 1. PTK Kammi and Mc Spiral Model. Taggart

Data collection techniques in this research include observation and tests. The instruments used are questions with indicators of creative thinking skills. The data analysis techniques used are quantitative and qualitative descriptive research. Quantitative data is in the form of data resulting from students' creative thinking skills and knowledge

competencies which are presented in the form of pictures and tables. For qualitative data in the form of data from observations of PTK implementation which are presented in the form of explanatory descriptions.

Table 1 . Indicators of Students' Creative Thinking Skills

Indicator	Criteria
Indicator 1	Able to answer questions fluently
Indicator 2	Able to think of more than one idea in solving a problem
Indicator 3	Have new ideas to solve problems
Indicator 4	Able to develop or enrich other people's ideas
Indicator 5	Able to conclude

Apart from creative thinking skills, students' knowledge competencies are also measured every cycle. The analysis and interpretation techniques for students' creative thinking skills can be seen in table 1.

Table 2 . Category of Students' Creative Thinking Skills

Enhancement	Category
81-100	Very creative
61-80	Creative
41-60	Quite creative
21-40	Less Creative
0-20	Not Creative

(Arikunto, 2009)

R RESULTS AND D ISCUSSION

Results

a. First Cycle Research Results

The results of the first cycle of research include critical thinking skills and knowledge competencies. Creative thinking skills include five indicators which can be seen in table 1. Aspects of creative thinking skills consist of fluent thinking, flexible thinking, original thinking, elaborative thinking and evaluative thinking (Armandita et al, 2017). The indicators used are answering questions fluently (indicator 1), thinking of more than one idea in solving a problem (indicator 2), having new ideas for solving problems (indicator 3), being able to develop or enrich other people's ideas (indicator 4) , and able to conclude (indicator 5). The following results of students' creative thinking skills can be seen in Figure 2.

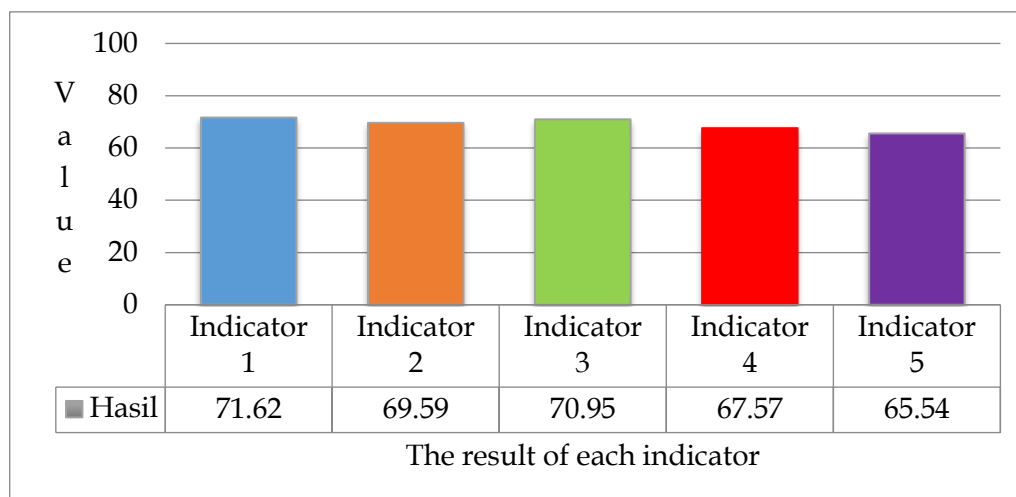


Figure 2 . Results of Cycle Creative Thinking Skills I

Based on Figure 1, you can see the results of students' creative thinking skills based on five indicators. The average of these five indicators is 70.97 in the creative category. Each indicator obtained from the analysis of students' creative thinking skills is in the creative category. This shows that students' creative thinking skills in implementing E-Handout using the PJBL model in cycle 1 are in the creative category. This also affects students' knowledge competency.

The knowledge competency of students in cycle 1 obtained an average of 70.19. The statistical parameters used to measure knowledge competency include average, variance, standard deviation, lowest and highest values, median and mode. The knowledge competency results can be seen in table 3.

can be seen in the following table.

Table 3 . First Cycle Student Knowledge Descriptive Statistics Parameter Values

No	Descriptive Statistics Parameters	First Cycle Value
1	N	36
2	Average	70.19
3	Variance	52.16
4	Standard Deviation	7.22
5	Lowest Value	60
6	The highest score	85
7	Median	70
8	Mode	60

Based on table 3, it can be seen the average knowledge competency of students. The highest score is 85 and the lowest score is 60. The lowest score, namely 60, is the score most often obtained by students. The average knowledge competency of students is 70.19, which is in the good category. However, the average knowledge competency of students does not meet the minimum level of student completeness, namely 80.00. Meanwhile, classical completeness obtained in the first cycle was 11.11%, while students' incompleteness was 88.89%. This shows the low level of classical completeness of students in knowledge competency in the first cycle.

b. Second Cycle Research Results

In the second cycle , researchers carried out follow-up actions to correct the weaknesses that occurred in the first cycle. This has an impact on improving students' creative thinking skills. The results of students' creative thinking skills can be seen in the following picture.

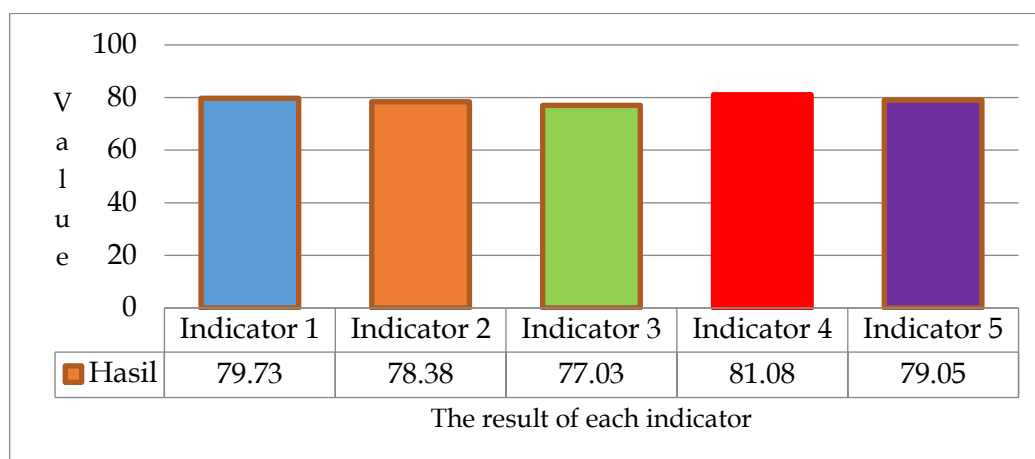


Figure 3 . Results of Cycle 2 Creative Thinking Skills

From this picture it can be seen that there has been an increase in each indicator. Likewise with the average of the five indicators. In the first cycle the average of students' creative thinking skills was 70.97 in the creative category, while in the second cycle the average was 81.25 in the very creative category. The five indicators analyzed are above the average of 75.00. Likewise, the fourth indicator increased from 67.57 to 81.08 so it is in the very creative category. This has an impact on increasing students' knowledge competency. The results of students' knowledge competency in cycle two can be seen in the following table.

Table 4 . Second Cycle Student Knowledge Descriptive Statistics Parameter Values

No	Descriptive Statistics Parameters	First Cycle Value
1	N	36
2	Average	82.25
3	Variance	39.30
4	Standard Deviation	6.27
5	Lowest Value	63
6	The highest score	92
7	Median	84.5
8	Mode	85

Based on this table, it can be seen that there was an increase in knowledge competency in the second cycle. In the first cycle the average knowledge competency was 70.19, while in the second cycle there was an increase of 82.25. The lowest score in the second cycle was 63.00 while the highest score was 92. The highest score obtained by students was 85.00. Likewise with students' classical completeness, in the first cycle it was 11.11% while in the second cycle it was 80.55%. This shows an increase in the classical completeness of students'

knowledge competencies. The increase in students' knowledge competency is influenced by the increase in students' creative thinking skills.

Discussion

In the two cycles that have been carried out in the research that has been carried out, it can be seen that there is an increase in students' creative thinking skills. Increasing students' thinking skills also influences knowledge competency which increases in the second cycle. In the first cycle the results of creative thinking skills had an average of 70.97, while in the second cycle the average was 81.25. Likewise, the average knowledge competency in the first cycle was 70.19 and increased in the second cycle to 82.25. To increase students' creative thinking skills and knowledge competencies, it can be seen in the following picture.

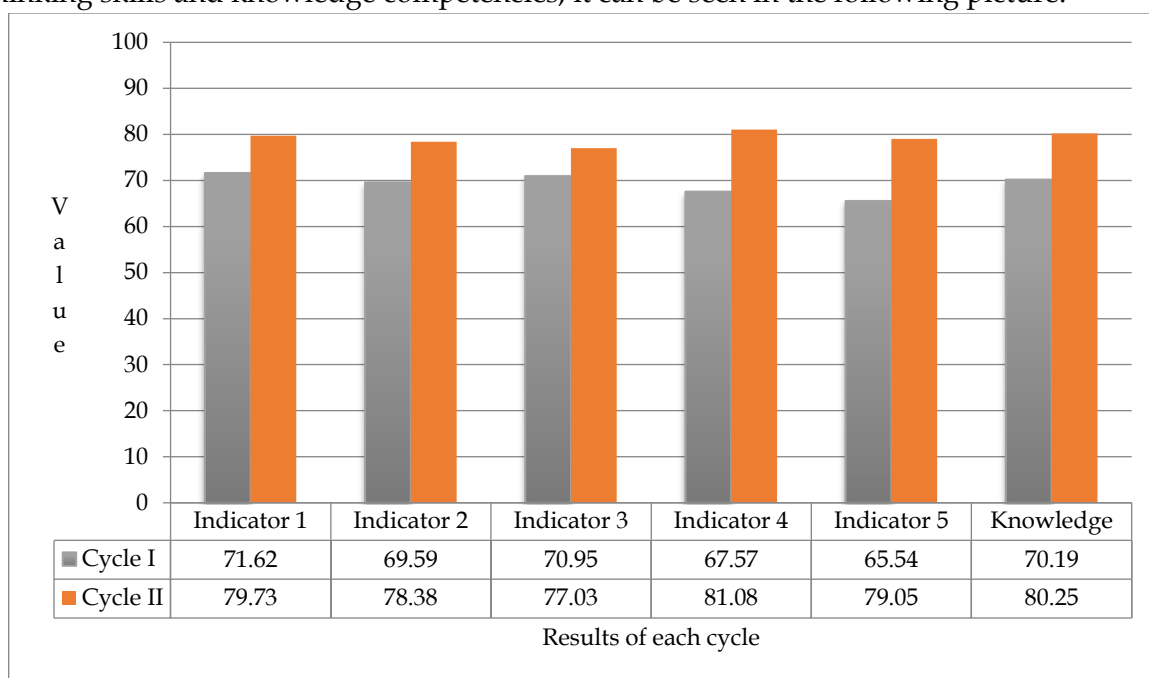


Figure 4. Increase in Creativity Results and Average Knowledge Competency in Cycle I and Cycle II

Based on Figure 3, there is an increase in creative thinking results from cycle I to cycle II. In the picture shown you can clearly see the increase in each indicator from cycle 1 to cycle two. A significant increase was seen in indicator 5, namely 20.61%, then indicator 4, namely 19.99%. The increase in indicator 2 was 12.63%, indicator 1 was 11.32% and indicator 3 experienced an increase of 8.56%. The increase in students' knowledge competency from cycle 1 to cycle 2 was 14.33%. Apart from that, students' classical completeness in the second cycle was 80.55%, while in the first cycle it was 11.11%. This shows that the research in the second cycle was said to be successful. This can be seen from the increase in students' creative thinking skills and knowledge competencies. Apart from that, students' classical completeness reached 80.55%. Because learning is said to be successful if students' classical mastery reaches 75% [(Yusuf & Fujiatutik, 2017). Therefore, the learning carried out in the second cycle was successful.

Increasing creative thinking skills is in line with increasing students' knowledge competency. There are several research results related to this classroom action research. Firstly, the application of the PBL model can improve Hartati students' creative thinking

abilities (Hartati, 2021). Second, the application of the PBL model can also improve student learning outcomes (Handayani, 2021). Third, there is a connection between improving students' creative thinking skills and learning outcomes, in this case knowledge competency (Hasmianti, 2018). Fourth, the application of the PBL model can improve creative thinking skills so as to help students understand and improve their knowledge competency (Putri, et al 2018). Therefore, the research carried out is in line with the results of research that has been carried out previously. However, in this classroom action research, the researcher carried out something new by integrating the PBL model into teaching materials in the form of E-Handouts. Meanwhile, previous research only used the PBL model in learning activities.

CONCLUSION

Based on the research that has been carried out, several conclusions have been obtained. Firstly, there is an increase in students' creative thinking skills from the first cycle to the second cycle so that the implementation of the integrated E-Handout PBL model can improve students' creative thinking skills. Second, the implementation of integrated E-Handouts with the PBL model can improve student learning outcomes, in this case knowledge competency. The three creative thinking skills of students influence students' knowledge competence, so that if creative thinking skills increase, it also has an impact on knowledge competence increasing or vice versa. Therefore, the application of E-handouts integrated with the PBL model can improve students' creative thinking skills and knowledge competencies.

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