

## Design and Implementation mDPBL Teaching Approach to Improve Students' Creative Thinking Skill

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**ABSTRACT:** The majority of learning in Universities is adopting the Direct Instructional (DI) approach. The DI approach is a lecturer-centered approach. However, this approach tends to be boring for the students as it is very tedious and dominated by the lecturer. Moreover, this approach limits students in developing the habit of problem-solving and creative thinking in learning processes. Therefore, it is very important to develop a new innovative approach in teaching activity that gives students more opportunities to be involved in the learning process. Direct Problem-Based Learning with the utilisation of Multimedia (mDPBL) is developed as an alternative teaching approach to eliminate the disadvantages, especially in the limitations in students' creative thinking. This research measures students' creative thinking skills after being taught using mDPBL approach. This research uses quasi-experimental method. 276 students involved in this research. The result of the measurement shows that the students' controlled group has an average score of 18.014 while the latter, the experimental group has an average score of 19.669. Based on the t-test analysis conducted in both groups, they have shown a difference of 1.655 in average score. Therefore, there is an indication that the mDPBL approach contributes to improving students' creative thinking skills.

**Keywords:** Direct Instruction, Problem-Based Learning, Creative Thinking

**ABSTRAK:** Sebagian besar pembelajaran di perguruan tinggi saat ini menggunakan pendekatan pembelajaran Direct Instruction (DI). DI adalah pendekatan pembelajaran yang berbasis pada dosen (lecturer-centred). Namun demikian, pendekatan ini sangat membosankan bagi mahasiswa karena proses belajar mengajar lebih didominasi oleh dosen. Selain itu, pendekatan ini juga membatasi mahasiswa dalam mengembangkan ide dan kreatifitas selama proses belajar mengajar berlangsung. Oleh karena itu, perlu dikembangkan sebuah inovasi pendekatan pembelajaran yang memberikan kesempatan kepada mahasiswa terlibat dalam proses belajar mengajar. Pendekatan Direct Problem-Based Learning berbasis multimedia (mDPBL) dikembangkan sebagai alternatif pendekatan pembelajaran untuk menyelesaikan permasalahan khususnya keterbatasan kemampuan creative thinking mahasiswa. Penelitian ini mengukur sejauhmana kemampuan creative thinking mahasiswa setelah pendekatan pembelajaran menggunakan pendekatan mDPBL. Penelitian ini menggunakan metode quasi-experimental. 276 mahasiswa terlibat dalam penelitian ini. Hasil pengukuran menunjukkan bahwa kelompok kontrol memiliki skor rata-rata 18.014 sedangkan kelompok eksperimen memiliki skor rata-rata 19.669. Berdasarkan analisis t-Test pada kedua kelompok menunjukkan perbedaan nilai rata-rata sebesar 1.655. Dengan demikian, terdapat indikasi bahwa pendekatan pembelajaran mDPBL berkontribusi terhadap peningkatan kemampuan creative thinking mahasiswa.

**Kata kunci:** Direct Instruction, Problem-Based Learning, Creative Thinking

## INTRODUCTION

The Law on the National Education System (SISDIKNAS) Number 20 of 2003 states that the national education system is the fundamental component that is interrelated and integrated to achieve national education goals. The purpose of national education is to develop the potential of students to become human beings who believe in and fear God Almighty, have a noble character and are healthy, knowledgeable, capable, creative, independent, and responsible. One of the educational goals above can be achieved by improving the quality of education that is carried out on an ongoing basis (Kusuma, 2018). The quality of education includes the quality of the process and the results. The quality of the process can be achieved if the learning process takes place effectively and students can live and undergo a meaningful learning process. Meanwhile, the quality of the results can be seen in the performance of students who show life skills and competencies with a high level of mastery including understanding and appreciation of knowledge, skills, attitudes, and also the value of learning tasks that are in accordance with the needs of students in learning.

Most of the learning in universities today uses the Direct Instruction (DI) learning approach (Gurses et al., 2015). This approach is famous among teachers and most teachers use this approach in the learning process in the classroom (Flynn et al., 2012). Some opinions state that DI is a lecturer-centered learning approach where all learning activities are fully controlled by the lecturer (Rich et al., 2005; Winarno et al., 2017). Unfortunately, this approach is very tedious for students because the teaching and learning process is dominated by lecturers rather than involving students in class activities. In addition, this approach also limits students' development of ideas and creativity during the teaching and learning process, causing low problem-solving abilities of students.

Problem-solving capability is a student's ability based on creative thinking ability in solving a problem. In other words, creative thinking ability is the most substantial part of solving a problem (Nulhakim et al., 2020; Simanjuntak et al., 2021). The Effectiveness in problem-solving is highly dependent on the extent to which students have creative thinking abilities (Sockalingam, 2011; Yuli & Siswono, 2014). Creative thinking is defined as a mental activity used to construct new ideas or ideas (Greene & Noice, 1988; Kivunja, 2015; Yuli & Siswono, 2014) describing creative thinking as subjective, diffuse, and right-brain-focused thinking. In other words, creative thinking is the ability to develop original ideas, forming new ideas that are better than before (Ersoy & Başer, 2014; Siburian et al., 2019; Winarno et al., 2018).

Therefore, this study was conducted to measure the extent to which students' creative thinking abilities in the learning process use a multimedia-based Direct Problem-Based Learning (mDPBL) approach.

## RESEARCH METHOD

### Design and Sample

In the quasi-experimental approach, there are two forms, namely time series design and nonequivalent control group design (William & Hita, 2019). The

pattern used in this study is quasi-experimental and uses a nonequivalent control group design model. Before being given treatment, the experimental group and the control group were given a test, namely the pre-test, to know the condition of the group before treatment. Then after being given treatment, the experimental group and the control group were given a test, namely the posttest, to determine the condition of the group after treatment. This study involved 276 students who took computer network courses in semester 4.140 students were used as controls also 136 students were used as experiments.

### Procedure and Instrument

The research was carried out for a semester of 14 meetings. The process of measuring students' creative thinking skill done by distributing questionnaires to students. The student's creative thinking skill questionnaire consists of 5 questions. The questionnaire was made using a Linkert scale of 1 to 5 that describes the opinions of strongly disagree, disagree, undecided, agree, and strongly agree. Furthermore, data analysis was carried out which included reliability and validity, normality tests, and T-tests using SPSS software.

## RESULTS AND DISCUSSION

### Results

As a solution to the current learning approach problem, the mDPBL's framework is proposed as an alternative learning approach. The mDPBL's approach is a combination of Direct Instruction and Problem-Based Learning approaches by utilizing learning multimedia. The mDPBL's approach is designed and developed as an alternative learning approach in group-based learning activities, one of which aims to improve students' creative thinking abilities.

Fig. 1 describes the activities of the mDPBL's learning approach which consists of four main stages of activity, namely introduction and identification, problem definition and solution, evaluation and conclusion, and learning outcomes.

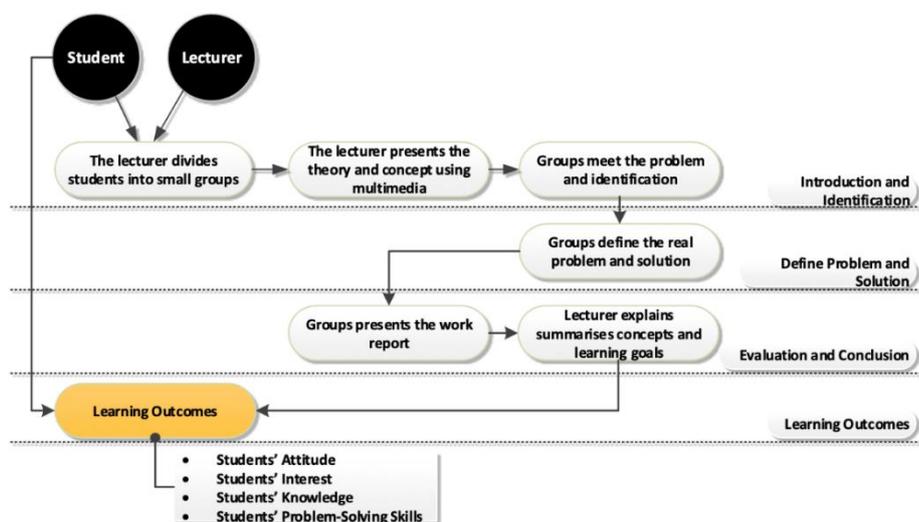


Figure 1. mDPBL learning approach design

Fig.1 depicts the stages in the mDPBL approach which is implemented in four main activity stages. The first stage is introduction and identification which consists of several activities, namely the lecturer divides students into small groups. Then the lecturer presented the concepts and theories using multimedia tools and activities to find problems and identify them in groups. In the second stage, the definition of the real problem and the resulting solution. Next in the third stage is the evaluation and conclusion. At this stage, the group presents a work report also the lecturer explains the illation of the concept and learning objectives. The last stage is the output of the learning process which is measured through the attitudes, interests, knowledge, and problem-solving skills of the students. Fig. 2 paints the mDPBL learning activity where students are divided into several small groups consisting of 4 to 5 students. Lecturers carry out learning assisted by multimedia learning. At the end of the lesson, each group presented the results of the work report.



**Figure 2.** mDPBL learning activities

The results of the questionnaire data analysis related to students' creative thinking abilities through analysis of the reliability and validity of the data showed that Cronbach's Alfa value was 0.799. This value illustrates that the questionnaire distributed to students has good reliability and consistency. The student's creative thinking ability questionnaire consists of 5 questions, namely 1) I am free to give ideas while studying (Q1). 2) I like non-stressful learning situations (Q2). 3) I am given the freedom to think while carrying out the task (Q3). 4) I always make plans for every assignment given by the lecturer (Q4). 5) I am free to use ideas in every assignment given by the lecturer (Q5).

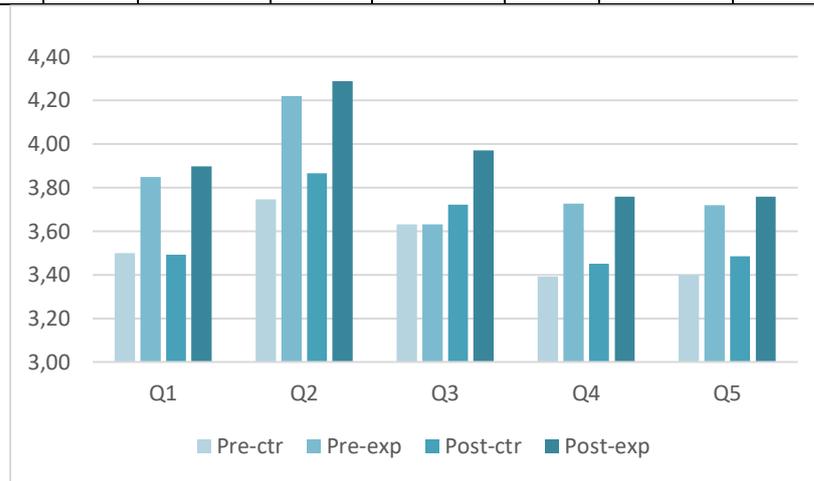
Table 1 summarizes the results of the pre and post-survey from the students' creative thinking data. Table 1 below shows the mean and standard deviation of students' creative thinking in the control and experimental groups. Based on the control group pre-survey's result, the mean score was above 3.0, and the standard deviation score was above 0.6, especially for Q2 which was more than 0.7. Meanwhile, the experimental group showed that the average value was above 3.0, especially for Q2 which was more than 2.0, and the standard deviation value was above 0.5, especially for Q5 which was more than 0.7.

Based on the results of the post-survey control group, the average score was above 3.0, and the standard deviation score was above 0.6, especially for Q2 was more than 0.7. Meanwhile, the experimental group showed that the average score was above 3.0, especially for Q2 reached more than four points, and the standard

deviation score was above 0.5, especially for Q5 reached more than 0.7. The distribution of student responses to students' creative thinking abilities can be seen in Fig.3.

**Table 1.** The results of data analysis of student responses to creative thinking abilities

Question	Pre-Survey				Post Survey			
	Kontrol/140		Eksperimen/136		Kontrol/140		Eksperimen/136	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Q1	3.500	.619	3.848	.599	3.493	.617	3.897	0.587
Q2	3.746	.715	4.220	.597	3.864	.712	4.287	0.529
Q3	3.630	.684	3.630	.684	3.721	.669	3.971	0.688
Q4	3.391	.621	3.727	.643	3.450	.627	3.757	0.638
Q5	3.399	.634	3.720	.745	3.486	.662	3.757	0.725



**Figure 3.** Distribution of student responses to creative thinking skills

Table 2 reveals the average score and the significant value of the creative thinking pre-test scores of the control and experimental groups. Following are the results of the analysis for the control and experimental groups respectively: N=140, mean = 17,.67, and SD=2.111 for the control group and N=136, mean = 17.932, and SD=2.101 for the experimental group. There was no significant difference in the average creative thinking score on the pre-test between the two groups as p-value > 0.05.

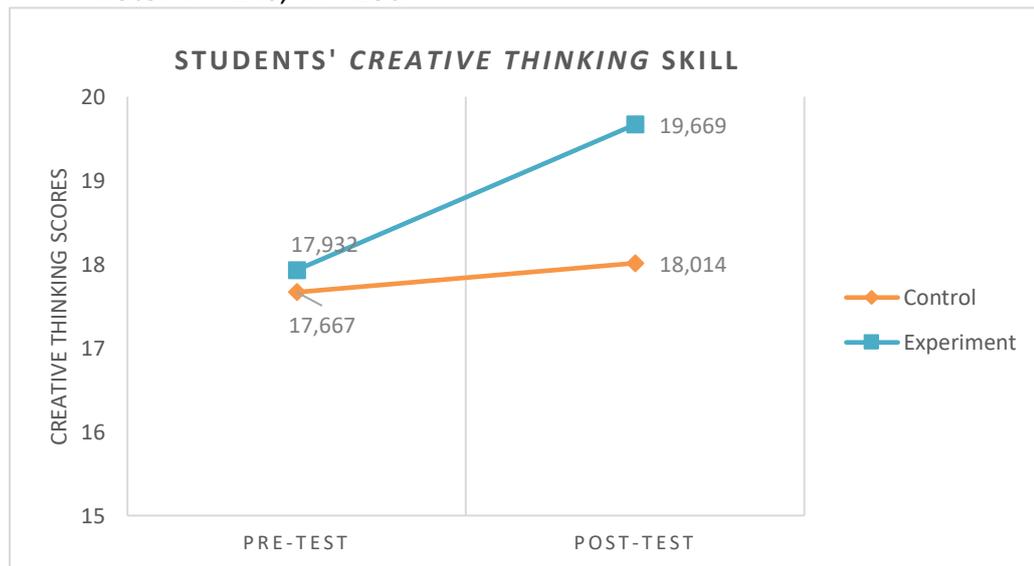
In the second test, Table 2 shows the mean and significant scores of creative thinking scores in the post-test for the control and experimental groups. Following are the results of the analysis for the control and experimental groups, respectively: N=140, mean = 18.014, and SD=2.273 for the control group and N=136, mean = 19.669, and SD=2.048 for the experimental group. There is a significant difference in the average creative thinking score on the post-test between the two groups as a p-value <0.05.

**Table 2.** Independent sample t-Test pada kemampuan *creative thinking* mahasiswa

Variabel	Kelompok	Mean	SD	t-test for Equality of Means			
				t	df	Sig. (2-tailed)	Mean Difference
Creative Thinking pre-test	Kontrol <sup>a</sup>	17.667	2.111	7.185	268	.302*	0.265
	Eksperimen <sup>b</sup>	17.932	2.101				
Creative Thinking post-test	Kontrol <sup>a</sup>	18.014	2.273	6.349	274	.000*	1.655
	Eksperimen <sup>b</sup>	19.669	2.048				

Significant at  $p < .05$

Note: <sup>a</sup>n = 140, <sup>b</sup>n = 136



**Figure 4.** Comparison of students' creative thinking abilities

Based on the results of the independent sample t-Test analysis (Table 2), it shows that there is no significant difference between the experimental group and the control group in students' creative thinking skills before using the mDPBL approach. However, the two groups showed significant differences in students' creative thinking skills after using the mDPBL approach. The experimental group showed significantly higher creative thinking skills in the post-test compared to the control group as shown in Fig.4 above. It shows that the mDPBL's learning approach contributes to the development of students' creative thinking skills.

### Discussion

The mDPBL teaching approach had improved the creative thinking skill of the experimental group as compared to the normal teaching approach. In this study, creative thinking skill was also significantly higher than that of the control group. This is in line with Wahyu et al. (2016), who stated that students' creative thinking was increased in the problem-based learning model (Simanjuntak et al.,

2021), whereby the experimental group had developed a more positive creative thinking.

This study reported that between the experiment and control groups, there was no significant difference in students' creative thinking skill before employing the mDPBL teaching approach. However, both groups indicated a significant difference in the students' creative thinking skill after employing the mDPBL teaching approach. This was shown in the experimental group which demonstrated a significantly better creative thinking skill in the post-test than those in the control group. Thus, based on the result of independent sample t-Test analysis, there are an indication that the mDPBL teaching approach for teaching strategy is contribute to students' creative thinking development. In the other word, multimedia learning helps improving students' creative thinking skill (Darmawan et al., 2020; Hermita et al., 2022).

## CONCLUSSION

In this study, creative thinking skills were significantly higher in the experimental group compared to the control group. It indicates that students' creative thinking abilities increased in the problem-based learning model, whereas the experimental group had shown an increase in students' creative thinking skills.

This study concluded that between the experimental and control groups, there was no significant difference in creative thinking skills before using the mDPBL teaching approach. However, both groups showed significant differences in students' creative thinking skills after using the mDPBL teaching approach. The post-survey measurement shows that the control group has an average score of 18.014 while the experimental group has an average score of 19.669. Based on the t-test analysis in the two groups, the difference in the average value was 1.655. Thus, there are indications that the mDPBL learning approach contributes to the development of student's creative thinking.

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