



The problem-based contextual learning: an analysis of effectiveness through students' learning result

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Abstract

This present study aims to examine the effectiveness of Problem-Based Contextual Learning model from students' result of learning history subject at SMAN 3 and 4 in Padangsidempuan city. The students' result of learning were collected by the design of experimental and control class with the pretest and posttest. The students' learning result were then analyzed by using Kolmogorov-Smirnova and Shapiro Wilk technique to clarify the effectiveness of Problem-Based Contextual Learning model. The statistic calculation of the difference value between pretest and posttest denotes a raise of learning result by using the Problem-Based Contextual Learning model. The effectiveness test shows a normal distribution for both schools and class designs, which all significant values is bigger than 0.05. Besides, the effectiveness is also represented by a homogeneous distribution for both schools and class designs, which all significant values is bigger than 0.05. This study proves that the Problem-Based Contextual Learning model is an effective model to raise student's learning result in history subject.

Keywords:

problem based contextual, learning model, effectiveness, history subject

Introduction

The learning model is a plan or a pattern that can be used as a guide in

designing classroom learning to determine learning tools including books, films, computers, curriculum and others (Bruce Joyce et al., 2000). states that the learning model is a conceptual framework that describes a systematic procedure in organizing learning experiences to achieve certain learning goals and serves as a guide for learning designers or teachers in planning teaching and learning activities. With this understanding, it can be seen that the learning model is also a series of systematic procedures. Teacher can design learning activities to achieve the goals. In other words, the application of learning model will lead the teacher to carry out learning activities in accordance with the procedures required by the model (Trianto, 2010).

The success of the learning process cannot be separated from the ability of teacher to apply learning models that are oriented towards increasing the intensity of student involvement effectively in the learning process. Thus, the main consideration of the learning model is the teaching goal to be achieved (Eviyanti et al., 2021). Currently, there are many learning models that have been designed; they are very helpful for teachers to maximize teaching and learning activities. Teachers are not only required to use existing learning models, but also must be creative and innovative in collaborating various learning models based on student needs and maximizing the role of students as learners to be able to develop their own abilities. There is no one model that fits to all subject. Teachers need to adapt learning models to meet student needs to a subject of study (Affandi et al., 2022). Therefore, every level of education will need a certain learning model to achieve the goal in any subject learning.

Joebagio et al. (2018) showed that the Deconstructive model is evidently effective and reasonably to achieve students' higher order thinking skill. Zahro and Irawan (2022) found that senior high school students' acts, antusias, and skill of presentation have effectively raised by applying Think Talk Write (TTW) model. Meanwhile, Nasution et al. (2020) examined Problem-Based Learning Development and Reward to raise university students' problem solving abilities. The results of the product validity test obtained high validity criteria, and the results of the practicality test were in high validity as well. The results of the effectiveness test are in the effective category, so that the Problem based learning model and the rewards denotesthe effective in increasing students' conceptual understanding and problem solving abilities. In addition, Aldila and Mukhaiyar (2020) also found that Problem-Based Learning model is more effective to the subject of electronic and electricity at high school of SMKN 1 Bukit Tinggi. To the contextual learning model, Nora (2020). has analyzed the development of contextual learning model to increase students' responsibility and honest, while Asrizal (2019).has examined the development of contextual learning model to increase high school students' literacy. They prove that the contextual learning is the effective model to increase those students' behaviors and competences.

Those authors above denote that each subject and level of education require a certain learning model, and History subject at the high school level needs a

learning model that develops students' cognitive, affective, and psychomotoric (Pernantah, 2020). Learning history subject for students is very important because it can help think more critically and wisely, and be able to understand the meaning and value of each past event to prepare the future. The purpose of learning history is not only limited to the cognitive domain (knowledge) but it can reach the psychomotor realm in the process of forming students' character (Sopacua et al., 2020).

In History subject, the contextual teaching and learning model through textual lesson is commonly used. It is a learning model that links the lesson material to real-world situations, and makes connections between students' knowledge and its application in their family life and community members. (Asmara & Bakar, 2020) However, the contextual learning model has some weaknesses, they are: first, it takes a long time when the contextual learning process conducted. Second, the teacher cannot control the class so it can create a less conducive class situation. In the Contextual Teaching and Learning, the teacher no longer acts as an information center. The teacher's responsibility is to manage the class as a team that works together to discover new knowledge and skills for students. Students are seen as developing individuals (Nurhidayah et al., 2016).

Consequently, some Indonesian historians declare that the learning model, including Contextual Teaching and Learning, that regularly applied for learning history subject is insufficiently effective. Those weaknesses need to be solved by combining Contextual Learning with Problem-Based Learning. It is because students need to have competences of making decision as well as determining a logic act toward problems in the society (Syaputra & Sariyatun, 2019). This present study proposes the Problem-Based Contextual Learningmodel for History subject in high school level. The Problem-Based Contextual Learningmodel is developed from Contextual Teaching and Learning. In this model, media takes an essential role to learn History subject, for example, documentary film that provides visualization. The visualization in film raises a depth feeling though teacher remains taking the most important role to explain any essential point in the film. Therefore, this present study aims to examine the effectiveness of Problem-Based Contextual Learningmodel to history subject at the high level of education.

Literature review

Social Constructivism

Social constructivism is based on specific assumptions about reality, knowledge, and learning (B. Kim, 2001) It refers to information or knowledge that did not previously exist and then was built through human activities or collective groups, not individuality (Kukla, 2013). Social constructivist theory emphasizes that learning understanding can be built through interaction between the learner and the environment (peers, teachers or others) that are relevant to learning (Duffy & Cunningham, 1991).It indicates that knowledge is constructed through social

interactions, and is the result of social processes (Gergen, 1995).

Social constructivism assumes that humans rationalize their experiences by creating models of the social world and considering language as the most essential system by which humans can carry out the construction process (Leeds-Hurwitz, 2009). Understanding environment and construct social knowledge allows students to relate themselves to circumstances. The roots of individual knowledge are found in interactions with the environment and other people before knowledge is internalized (Roth, 2000). Students who are able to have interaction present that they have been able to develop thinking skills.

Students play a passive role when the teacher only teaches, but students play an active role when the teacher facilitates the learning process and helps students to learn (Brownstein, 2001) in which teachers become a facilitator (Bauersfeld, 1995). The teacher's role as a facilitator includes: acting as a questioner; distributing guidelines then creating an appropriate atmosphere for students to arrive at their own answers and conclusions, and moderating dialogue with students (Rhodes & Bellamy, 1999). Social constructivism provides several beneficials for the learning process, such as connecting the context of learning to daily life, triggering students' existing ideas, carrying out activities that built against students' current understanding, and promoting conceptual change that requires understanding (based on problem) by using questions of how and why. Nonetheless, teacher should provide a time for thinking because offering a question requires time to think, and reflect on their own thinking and learning processes. It is because "the appropriate metacognitive learner is one who can effectively carry out the constructivist process of recognizing, evaluating and, if necessary, reconstructing existing ideas (Tsai, 2001).

Learning Model

According to Meyer (1985) a model is an object or concept that is used to represent something tangible and conversion to a more comprehensive form. Models can be realized in various shapes, sizes and styles. However, models are not the reality object, but they are constructed by human that can help to understand the existing system. Therefore, in the simple term, the model can also be understood as an item or an imitation of a real object, for example a fighter plane model, a waste treatment model and etcetera. It is because a model is able to represent the actual object and it can be used for various activities such as introduction and training. By using model, people can gain comprehensive knowledge and understanding of the work system or the benefits of the object. On the other hand, (Winatapura, 2001). describes the model as a framework concept used as a guide in carrying out an activity. This shows that the model can not only be a replica of a concrete object but it can also be a conceptual framework that connects an interrelationship of various elements in the system that humans need. Therefore, the conceptual model is a qualitative model that can explain the process of interconnectedness of important factors in a system of learning.

According to B. Joyce et al. (2009), the learning model is classified into four main groups, namely: the information-processing learning model group (the informationprocessing family), the social learning model group (the social family), the personal learning model group (the personal family), and the behavioral systems learning model group (the behavioral systems family). Some of the models provide information and concepts to students, and emphasize conceptual structure and hypothesis testing on creative thinking. The models include inductive thinking, concept discovery, inductive models, and scientific research. (B. Joyce et al., 2009). A learning model processes information and emphasizes ways to increase the natural urge to compose the meaning about the world by obtaining data, finding problems and generating appropriate solutions, and developing concepts and language to transfer those solutions or data. Thus, the effectiveness of a learning model becomes important to develop students' abilities and competences.

Effectiveness of Learning Model

Effectiveness is the implementation of activities properly, regularly, cleanly, in accordance with the provisions and containing qualitative and artistic elements. (Sholikhah et al., 2018). It indicates that effectiveness is an effort to achieve the targets that have been set in accordance with the needs, plans, using available data, facilities, and time to obtain maximum results of both quantitatively and qualitatively. Effectiveness refers to an effect that brings results. Therefore, a learning model should be effective in its function and application. Reigluth Haviz (2012) states that effectiveness in a learning model is highly important to implement. It is because effectiveness represents the determination of the level or degree of a theory or model application in certain situations. Nieveen and Folmer (2013) states that in a research of model development, the effectiveness refers to the level of consistency of experience with the desired goal.

The effectiveness of a learning model is determined from how much impact have been emerged by the model toward the research variables, such as the learning result, skills or students' attitude. An effective model can provide a significant difference in learning results between before and after the application of the model. The results of the effectiveness analysis of the model must be strengthened by statistical analysis so that the conclusions drawn are more tested and can be accounted for.

Methodology

There are 124 students of XII class level at senior high school number 3 (hereafter SMAN 3) and senior high school number 4 (hereafter SMAN 4) in Padangsidempuan city, West Sumatera, Indonesia participated as the respondents in this present study. The participants were selected by random, which were taken two classes, one class is for the experimental design and another is for control class design. At the SMAN 3, 32 students were selected for experimental class

design, and 30 students were chosen for control class students. Meanwhile, 31 students were selected from one class as well as 31 students from another class at SMAN 4. Data were collected by observation sheets, questionnaire, and interview sheets from students' activities, responses, and improvements in the experimental and control class design. It functioned to highlight the students' result of learning History subject by using Problem-Based Contextual Learning model.

This experimental class design was in the form of randomized control group and control class with pretest-posttest design to the participants. The purpose of experimental research is expressed by Isaac and William (1977), which indicates to examine the possibility of causality by applying one or more treatment conditions to one or more experimental groups and comparing the results with one or more untreated control groups. In experimental research, the meaning of the experimental group and the control group is distinguished. The experimental group is the group that is given treatment in the form of independent variables, while the control group is the group that is not given any treatment or given natural treatment (Azwar, 2007)

Analysis of the effectiveness of the Problem based contextual learning model was obtained from students' knowledge abilities. Data analysis was used to see whether the use of Problem-Based Contextual Learning model, teacher books and student books influenced student's learning results. Before analyzing the students' history learning results, the requirements test were first carried out, namely: normality test and homogeneity test of variance. Normality test aims to see whether the sample data is normally distributed or not. Normality test was applied by using the Kolmogorov Smirnov test with SPSS software. The data is normally distributed if the significant level obtained is greater than the 0.05 level of significance (Abbott, 2014). The homogeneity of variance test was carried out on the final test data to see whether the two sample groups had homogeneous variance or not. This test was performed by using Levene's test of SPSS program. The data refers to a homogeneous variance if it is significantly greater than 0.05. The analysis of students' results of knowledge capabilities was conducted by using t-test statistics and if the data is not normally distributed, then a nonparametric test is carried out with the SPSS program.

The effectiveness of Problem-Based Contextual Learning model was performed by the increase or decrease of students' result of learning, and it was examined by conducting the normality test through *Kolmogorov-Smirnov^a* and *Shapiro-Wilk* of SPSS program. The normality test aims to see whether the sample data is normally distributed or not. The data is normally distributed if the significant level obtained is greater than the 0.05 level of significance (Riadi, 2016). Besides, the effectiveness was also examined to find homogeneous variance. It is conducted by using *Levene* statistic of SPSS program. The data is considered as a homogeneous variance if it is significantly greater than 0.05. After that, The change of students' learning result, which indicated the ability of knowledge and problem solving skills, was examined by using *t-test* of SPSS program. This test aims to find

the null hypothesis (H0), which is used to confirm the relationship between the fact and condition of the fact.

Result and discussion

The average student learning results of experimental class at SMAN 3 had an average pre-test of 45.7 while the average post-test was 82.2 with an average gain (Δ) of 16.5. Whereas, the control class had a pre-test average of 43.8 while the post-test average was 65.0 with an average gain (Δ) of 8.2. The average student learning results of experimental class at SMAN 4 had an average pre-test of 48.0 while the average post-test was 85.8 with an average gain (Δ) of 17.8. Whereas, the control class had a pre-test average of 46.1 while the post-test average was 66.8 with an average gain (Δ) of 13.7. See table 1 below.

Tabel 1. The Average of Students' Learning Result

School	Class Design	N	Pretest Average	Posttest Average	Gain (Δ) Average
SMAN 3 Padangsidimpuan	Experimental	32	45.7	82.2	16.5
	Control	30	43.8	65.0	8.2
SMAN 4 Padangsidimpuan	Experimental	31	48.0	85.8	17.8
	Control	31	46.1	66.8	13.7

Based on the results above, it can be seen that the increase in student learning result with the Problem-Based Contextual Learning Model in learning history is higher than the learning model commonly used by teachers. The analysis precondition test was then performed, and the analysis precondition test was to perform a normality test using the Mann-Whitney and Shapiro-Wilk tests. The result of the *Gain* (Δ) average between pretest and posttest in the table above presented a raise of students' learning result to history subject by using the Problem-Based Contextual Learning model. However, the effectiveness of the model was firstly examined by *Kolmogorov-Smirnova* and *Shapiro-Wilk* test to figure out the normality. The following table show the results of the normality test that indicates the raise of students' learning result to History subject at SMAN 3 and SMAN 4.

Test the effectiveness of the Problem-Based Contextual Learning Model for learning History subject is the result of learning in the aspect of knowledge. The knowledge aspect was tested after students took part in the learning using the Problem-Based Contextual Learning Model. The effectiveness of this model is determined from how much impact the model has on the research-bound variables such as students' learning results. An effective model is a model that provides a significant difference in results between before treatment (using the model) and after treatment. The results of the analysis of the effectiveness of the model should be strengthened by statistical analysis so that the conclusions drawn are more tested and can be accounted for. The data used in the statistical calculations were

data from students' learning results, which were used for the experimental and the control class design.

Tabel 2. The Test of Normality at SMAN 3 in Padangsidimpuan City

	Class Design	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Value	Control	.138	30	.150	.938	30	.079
	Experimental	.247	32	.162	.813	32	.120

Tabel 3. The Test of Normality at SMAN 4 in Padangsidimpuan City

	Class Design	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Value	Control	.132	31	.178	.962	31	.325
	Experimental	.200	31	.103	.825	31	.090

The value will be declared as normal if it is higher than α ($\text{sig.} > \alpha$). (Abbott, 2014). The *sig.* is for significance value, while the α is equal to 0,05 (Riadi, 2016). The table 2 shows a significance value of 0,162 > 0 05 for experimental class and 0,150 > 0,05 for control class at SMAN 3. Meanwhile, the result of the normality test at SMAN 4 in table 3 presents a significance value of 0,103 > 0,05 for experimental class and 0,178 > 0,05 for control class. It can be claimed that both classes design in those schools are normally distributed. Another value to present the effectiveness of Problem-Based Contextual Learning model is the homogeneous variance, by using *Levene Statistic* test, as in table 4 and 5.

Tabel 4. The Test of Homogenous Variance to Students' Learning Result at SMA N 3 Padangsidimpuan

Levene Statistic	df1	df2	Sig.
7.387	1	62	.139

Tabel 5. The Test of Homogenous Variance to Students' Learning Result at SMA N 4 Padangsidimpuan

Levene Statistic	df1	df2	Sig.
.011	1	60	.916

The value of $\text{sig.} > \alpha$ is declared as homogeneous. The *sig.* is for significance value while the α is for value of 0,05 (Riadi, 2016). The result of significance value in the table 4 shows 0,139 > 0,05 at SMAN 3. Meanwhile, at SMAN 4, the significance value is 0,916 > 0,05. The results prove that the raise of students'

abilities at both schools are homogeneous. It means that students' ability of knowledge and problem solving have increased by using the Problem-Based Contextual Learning model. Furthermore, the *t*-test was conducted to verify the effectiveness of Problem-Based Contextual Learning model, as the follows.

Table 6. The *t*-test of the Raise of Students' Learning Result at SMAN 3 Padangsidimpuan

	Value	Paired Differences				t	df	Sig.(2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	69.62500	21.95775	2.74472	64.14012	75.10988	25.367	63	.000	

Table 7. The *t*-test of the Raise of Students' Learning Result at SMAN 4 Padangsidimpuan

	Value	Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	67.85938	19.48615	2.43577	62.99188	72.72687	27.860	63	.000	

The *H0*(null hypothesis) will be rejected if the significance value is smaller than α ($\text{sig.} < \alpha$). The *sig.* is for significance value, while the α is equal to 0,05 (Riadi, 2016). The results value in both tables above are 0,000. It is smaller than 0,05, which indicates the *H0* is refused (Abbott, 2014). This means that the Problem-Based Contextual Learning model had elevated the students' learning result to history subject, whereas the others model were not.

Discussion

The effectiveness of problem based contextual learning model is seen from the increase of students' knowledge competences, which were tested by pretest and posttest about the subject material and problem solving. Data analysis showed that the increase of student knowledge learning results with the Problem-Based Contextual Learning model was higher than the increase of student knowledge learning results with learning that did not use Problem-Based Contextual Learning. These results are in accordance with the opinion of D. H. Jonassen (1997), that Problem-Based Learning involves various cognitive activities such as proportional information, concepts, principles and rules that are in the knowledge domain. In addition, problem solving also involves structural knowledge, including networking, semantic mapping, concept maps and mental models. Problem-based learning also includes applicative skills such as the construction and application of arguments, analogies, inferences. In addition, according to D. Jonassen and Tessmer (1996)

problem-based learning also involves motivation and attitudes. The opinion above is in accordance with the results of the effectiveness test of the Problem-Based Contextual Learning model for learning history subject, which improve the learning results in the aspect of knowledge. M. K. Kim (2015) states that Problem-Based Learning contains an authentic assessments that allows students to gain learning experiences at a higher level of knowledge structure. Therefore, this model presents an effective use for history subject.

According to Kauchak and Egen (2009), physical, cognitive, and mental involvement in a learning is a way to gain a deep and broad understanding of the material. This model can raise students' learning results, especially to history subject because students engage in somewhat challenging task activities both individually and in groups. Exploring the learning resources is a way that triggers to the right understanding and give the students a practice how to use and discuss the learning resources. In conventional learning model, students only receive from the teacher or memorize what is in the learning book, whereas by placing students on challenging structured tasks with Problem-Based Contextual Learning can make them challenged to respond, and increase their learning result (Chaiklin, 2007). The existence of initial assignments that can generate students' initial knowledge about history lesson means that it is not only able to arouse students' interest in learning but also connect them with concepts that have been studied previously. This is able to direct students to focus more on what will be discussed, as Kauchak and Egen (2009) states that understanding a new lesson is highly dependent on previous knowledge.

Conclusion

The problem based contextual learning statistically proves an effective model that can raise students' learning result. It was proved by the average of pretest and posttest, which presents the learning result before and after the application of the problem based contextual learning model. In addition, the learning model also distributes normal and homogeneous, and students' thinking skill, such as problem solving have been developed. The learning process conducted with Problem-Based Contextual Learning model proves a significant raise of students' learning result to History subject. The application of this model provides opportunities for students to gain a better understanding in terms of cognitive. It is because the concept of constructivism is applied, which facilitates students to figure out a knowledge through a learning media. This model involves students to find a comprehension critically. It means that with the problem based contextual learning model, the teacher does not directly convey the lesson, but he involves students physically and cognitively by using any media.

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