The Implementation of Contextual Learning Strategies to Stimulate Students' Critical Thinking Skills
La aplicación de estrategias de aprendizaje contextual para estimular la capacidad de pensamiento crítico de los estudiantes

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Abstract. Critical thinking skills are one of the things that students must have. But in reality, there are still a few students who have high critical thinking skills. So the application of the right learning model is needed. This study aims to apply the contextual teaching and learning (CTL) strategy in an effort to encourage students to have critical thinking skills. The experiment was conducted using a one-group post-test design involving twenty-four students. The instrument used was an assessment rubric with a Likert scale, processed both descriptively and quantitatively. The results showed that the overall achievement of student learning outcomes using CTL was dominantly in the sufficient category. The results of the effect test showed a significance of 0.000 <0.05, so it can be said that the contextual learning strategy has a significant effect. The results of the study indicate that the application of contextual learning strategies can improve students' critical thinking skills. The results achieved are better because CTL is a relatively new learning strategy and encourages students to think at a higher level. Nevertheless, through CTL, students are encouraged to provide enthusiasm for learning, increase motivation to be active in learning, assist in developing tasks, assist in problem solving, provide ways to discuss and interact with their peers, and help summarize and reflect on lessons. Thus, it can be concluded that CTL can stimulate students' critical thinking skills, so contextual learning strategies can be applied to students.
Keywords: CTL, Critical Thinking, Student

Resumen. Las habilidades de pensamiento crítico son una de las cosas que los estudiantes deben tener. Pero, en realidad, todavía son pocos los estudiantes que tienen altas capacidades de pensamiento crítico. Por eso es necesario aplicar el modelo de aprendizaje adecuado. Este estudio pretende aplicar la estrategia de enseñanza y aprendizaje contextual (CTL) en un esfuerzo por animar a los estudiantes a tener habilidades de pensamiento crítico. El experimento se llevó a cabo mediante un diseño post-test de un grupo en el que participaron veinticuatro estudiantes. El instrumento utilizado fue una rúbrica de evaluación con una escala de Likert, procesada tanto descriptiva como cuantitativamente. Los resultados mostraron que el logro global de los resultados de aprendizaje de los estudiantes mediante el uso del CTL se situaba predominantemente en la categoría de suficiente. Los resultados de la prueba de efecto mostraron una significación de 0,000 <0,05, por lo que puede decirse que la estrategia de aprendizaje contextual tiene un efecto significativo. Los resultados del estudio indican que la aplicación de estrategias de aprendizaje contextual puede mejorar las habilidades de pensamiento crítico de los estudiantes. Los resultados obtenidos son mejores porque el CTL es una estrategia de aprendizaje relativamente nueva y anima a los estudiantes a pensar a un nivel superior. Sin embargo, a través del CTL, se anima a los estudiantes a proporcionar entusiasmo por el aprendizaje, aumentar la motivación para ser activos en el aprendizaje, ayudar en el desarrollo de tareas, ayudar en la resolución de problemas, proporcionar formas de discutir e interactuar con sus compañeros, y ayudar a resumir y reflexionar sobre las lecciones. Por lo tanto, se puede concluir que el CTL puede estimular las habilidades de pensamiento crítico de los estudiantes, por lo que se pueden aplicar estrategias de aprendizaje contextual a los estudiantes.
Palabras clave: CTL, pensamiento crítico, estudiante

Introduction

Along with the development of the 21st century, every student must have four main competencies, namely critical, creative, collaborative, and communicative thinking which are carried out in the form of active or student-centered learning (Bialik et al., 2015; Rahmadi et al., 2023). This requires a major change in learning. The learning carried out must be able to encourage students to think critically about a material or problem, to collaborate with colleagues in studying the material, have creative abilities in solving a problem, and to communicate ideas or concepts that have been obtained both orally and in writing. Based on the research conducted by (Tathahira, 2020), students in Indonesia still lack in critical thinking skills. Therefore, the ability to think critically is very important for students. This is reinforced by a statement from Ebiendele Ebosele Peter (2012) that critical thinking skills are very important for students to be able to solve the problems they face.

Further statements by Flores et al., (2012), critical thinking is an ability possessed by all individuals, which can be measured, trained, and developed. One's critical thinking is inseparable from one's way of reasoning about what one is doing. This statement is reinforced by (Mashud, Warni, et al., 2023) indicates that a mental operational activities such as reasoning, evaluation and classification. While the statement differs from Fogarty, R., & McTighe (1993) which state that critical thinking is a way of thinking that is realistic or based on a relatively reasonable way of thinking or a person's way of reasoning to do work and determine the work he believes in.

The concept of learning in the 21st century is far different from the learning commonly used in education in Indonesia, namely learning by memorizing facts without meaning (Wijaya et al., 2016). Related to this, the learning provided not only provides material, but also involves students in learning actively, creatively, communicatively and collaboratively. Thus, lecturers must be able to carry

out learning with the right approach, which is useful for encouraging students to be active in learning and facilitating students to achieve these competencies (Aziz, Okilanda, Permadi, et al., 2023; Aziz, Okilanda, Rozi, et al., 2023; Harianto et al., 2023; Mashud, Warni, et al., 2023; Tanri et al., 2023; Umar et al., 2023).

In line with the demands of today's graduates are that students must be able to apply their skills, take advantage of science and technology, face and solve problems according to their expertise, and adapt to changes that occur (Aziz, Okilanda, Permadi, et al., 2023; Aziz, Okilanda, Rozi, et al., 2023; Hardinata et al., 2023; Perdana et al., 2023; Rahmadi et al., 2023; Samodra et al., 2023; Suryadi et al., 2024). Thus, lecturers are required to be able to create the right lecture atmosphere. In carrying out lectures not only in the form of delivering material theoretically, but also students must be actively involved in finding and building their own knowledge and how to apply knowledge in real conditions. Students are also encouraged to find the necessary information by themselves from various sources including texts, research articles, dialogues with experts in an effort to find a solution to a problem (Curry Jr. et al., 2012).

The lecturer can do this by implementing contextual learning strategies. According to (Chi Hyun et al., 2020), one approach that has the goal of a strategy in teaching is Contextual Teaching and Learning (CTL). Contextual Teaching and Learning (CTL) is a holistic learning process and aims to motivate students to understand the meaning of subject matter by correlating the material to the context of everyday life. Thus, they have knowledge or skills that are flexible and can be applied from one context to another (Majid, 2014; Berns & Erickson, 2001). In addition, through the CTL strategy, it allows students to use their understanding and academic abilities to solve simulative or real problems, both alone and together (Rusman, 2012), and a way to introduce learning content to help students connect existing experiences with what is expected of learning, and to build new knowledge from the analysis and synthesis of the learning process carried out (Hudson & Whisler, 2007).

The use of the CTL strategy can improve thinking skills and train divergent and evaluative thinking (Suryawati et al., 2010), can increase the achievement of learning outcomes (Rahayu, 2015), can increase motivation in learning (Suparman et al., 2013), encourage students to communicate and think critically, and can develop behavior, achievement of learning outcomes, and critical thinking skills (Sung et al., 2015). Therefore, according to Rosalin (2008), the teaching and learning process must reflect communication and direction, not merely providing unidirectional information from the lecturer without developing the mental, physical abilities and self-appearance of students. The teaching and learning process must be able to develop ways of learning to obtain, manage, use, assess and communicate their acquisition (learning outcomes).

The processes that occur in using the CTL strategy are a process of activating existing knowledge, an activity to acquire and add new knowledge, a process of understanding and believing in the knowledge obtained, a process of applying knowledge and experience possessed, and a reflection on knowledge development strategies. This makes it possible for students to build their own knowledge based on their experiences in the learning they do. The use of CTL in learning is one of the steps that can be used in the 21st century learning. This is because CTL is conducted in a way introducing learning content designed to help students connect knowledge and expectations from learning, and to build new knowledge from the analysis and synthesis of the learning process.

Additional research conducted by Tamam Syaifuddin et al., (2021) emphasizes that Contextual Teaching and Learning is an instructional concept that necessitates educators to connect the presented material with real-world situations, prompting students to establish links between acquired knowledge and its practical application in their daily lives. Thus, employing suitable teaching methods becomes crucial for effective goal attainment (Mashud, Arifin, et al., 2023; Tanri et al., 2023). Despite the widespread acknowledgment of the importance of critical thinking skills, the challenge lies in implementing appropriate teaching strategies to stimulate these skills. Many conventional teaching approaches tend to be passive, failing to foster critical thinking in students. Hence, there is a need for an approach that offers contextual and pertinent learning experiences to help students enhance their critical thinking skills. In light of this, the current research aims to implement CTL in the teaching process to nurture students' critical thinking skills. The outcomes of this study are anticipated to provide insights into the practical application of CTL.

Materials and Methods

Participants

The population in this study were students of education science FKIP Tanjungpura University. The sampling technique used purposive sampling so that 24 students were obtained as test subjects.

Research Design

The research method used in this research was experimental research. This experimental research was conducted in lectures for one semester involving twenty-four students using the one group post test design. The research was conducted by dividing students into eight groups with each group consisting of three students so that the results of group work were a real picture of the performance results of each student. Each group was given the opportunity to analyze each problem based on the results of analysis, observation, and theoretical studies.

The learning steps used in CTL implementation are formulate, observe, combine, apply, and communicate. The first step was that the lecturer provided problems

related to the psychological phenomena experienced by athletes when training and competing, then students formulated the problems occurred. The second step was to observe and/or conduct interviews related to training and matches that have been carried out by athletes, either directly or through video. The third step combined the results of observations and interviews from several students then analyzed the behavior that should be carried out by athletes, and designed a psychological training program that was considered appropriate. The last step was to report the results of the implementation of the training program in a presented and written report (Hasibuan, 2014) concludes the implementation of the basic principles of CTL learning that contextual learning models prioritize learning strategies rather than learning outcomes, namely the learning process takes place naturally in the form of student activities in working and experiencing and not just the process of transferring knowledge from the teacher to students.

Data analysis

The instrument of data collection used a rubric with a Likert scale of 1-5. The assessment was carried out at each stage of learning used. The aspects of the assessment included accuracy, sharpness, and completeness in formulating problems, observations, results of combining and analyzing behavior, planning training programs, and reporting results. The data obtained were analyzed descriptively and quantitatively. Data analysis in the study was assisted by using Microsoft Excel and SPSS 26 software.

Results

Based on the results of the assessment of students' ability to formulate problems in table 1, many students scored 60-69 or the sufficient category with a percentage of 83% followed by a score of 50-59 or insufficient category (13%) and no one scored in the range 0-49. Only 4% of students scored in the 70-79 range or good category and no one has yet reached the excellent category.

Furthermore, the results of assessing the ability of students to collect data from table 2 were dominated by students who obtained scores in the range 60-69 or the sufficient category with a percentage of 71% followed by a score of 70-79 or a good category with a percentage (29%) and no one received a score in the range 0-49 or poor category, 50-59 or insufficient category, and 80-100 or excellent category. The results of assessing students' ability to carry out analysis in table 3 showed that the dominant students are in the range of 60-69 scores or the sufficient category with a percentage of 58% followed by scores of 70-79 or the good category (29%) and students who obtained scores in the range of 50-59 or the insufficient category was only 4%.

No one has scored in the 0-49 range or poor and no one has yet reached the 80-100 score range or excellent category.

Furthermore, the results of the assessment in table 4 of students' ability to plan training programs were dominated by students who obtained scores in the range of 60-69 or the sufficient category with a percentage of 58% followed by scores of 50-59 or insufficient categories with a percentage of 29% and 13% of students who are at value range 70-79 or good category. No one scored in the range 0-49 or poor category, and 80-100 or excellent category.

The results of the final report assessment in table 5 showed that students who obtain dominant scores in the range of 60-69 or the sufficient category with a percentage of 62% followed by scores of 50-59 or insufficient categories with a percentage of 25% and 13% of students who were in the value range of 70-79 or good category. No one scored in the range 0-49 or poor category, and 80-100 or excellent category.

The results of the assessment of student learning achievement in table 6 students obtain dominant scores in the range 60-69 or the sufficient category with a percentage of 67% followed by a score of 70-79 or a good category with a percentage of 20%, and students who are in the value range of 50-59 or the insufficient category with a percentage of 13%. No one scored in the range 0-49 or poor category, and 80-100 or excellent category.

Table 1.
Recapitulation of Student Capability Assessment Results in Formulating the Problem

No.	Value Range	Amount	Percentage	Category
1	80-100	0	0%	Excellent
2	70-79	1	4%	Good
3	60-69	20	83%	Sufficient
4	50-59	3	13%	Insufficient
5	0-49	0	0%	Very less

Table 2.
Recapitulation of Student Capability Assessment Results in Performing Data Retrieval

No.	Value Range	Amount	Percentage	Category
1	80-100	0	0%	Excellent
2	70-79	7	29%	Good
3	60-69	17	71%	Sufficient
4	50-59	0	0%	Insufficient
5	0-49	0	0%	Poor

Table 3.
Recapitulation of Student Ability Assessment Results in Doing Analysis

No.	Value Range	Amount	Percentage	Category
1	80-100	0	0%	Excellent
2	70-79	7	29%	Good
3	60-69	14	58%	Sufficient
4	50-59	3	13%	Insufficient
5	0-49	0	0%	Poor

Table 4.
Recapitulation of Student Ability Assessment Results in Planning an Exercise Program

No.	Value Range	Amount	Percentage	Category
1	80-100	0	0%	Excellent
2	70-79	3	13%	Good
3	60-69	14	58%	Sufficient
4	50-59	7	29%	Insufficient
5	0-49	0	0%	Poor

Table 5.
Recapitulation of Student Report Assessment Results

No.	Value Range	Amount	Percentage	Category
1	80-100	0	0%	Excellent

2	70-79	3	13%	Good
3	60-69	15	62%	Sufficient
4	50-59	6	25%	Insufficient
5	0-50	0	0%	Poor

Table 6.
Recapitulation of Achievement of Learning Outcomes Using the CTL Method

No.	Value Range	Amount	Percentage	Category
1	80-100	0	0%	Excellent
2	70-79	5	20%	Good
3	60-69	16	67%	Sufficient
4	50-59	3	13%	Insufficient
5	0-50	0	0%	Poor

Based on the results of the normality test using the Shapiro-Wilk formula, the value shows significance ($p > 0.05$) which means that the data shows a normal distribution, so the data continues to use parametric hypothesis testing. The results can be seen in table 7. Furthermore, the results of the effect test using the paired-sample t test provide a significance value of $0.000 < 0.05$, so it can be said that the contextual learning strategy has a significant effect. The results can be concluded that the implementation given in the form of contextual learning strategies can improve students' critical thinking skills, so contextual learning strategies can be applied to students. The results can be seen in table 8.

The data in table 9 and figure 1 provide additional information regarding the improvement after being given a contextual learning strategy. The results show that the mean posttest value of 74.54 is greater than the mean pretest value of 53.67 where there is a difference of 20.89.

Table 7.
Shapiro-Wilk Normality Test Results

	Statistic	df	Sig.
Pretest Critical Thinking Skills	0.966	24	0.563
Posttest Critical Thinking Skills	0.882	24	0.060

Table 8.
Paired-Samples t Test Results

	Result	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1	Pretest Critical Thinking Skills - Posttest Critical Thinking Skills	-20.875	7.881	-12.976	23	0.000

Table 9.
Descriptive Statistics Results of Critical Thinking Skills

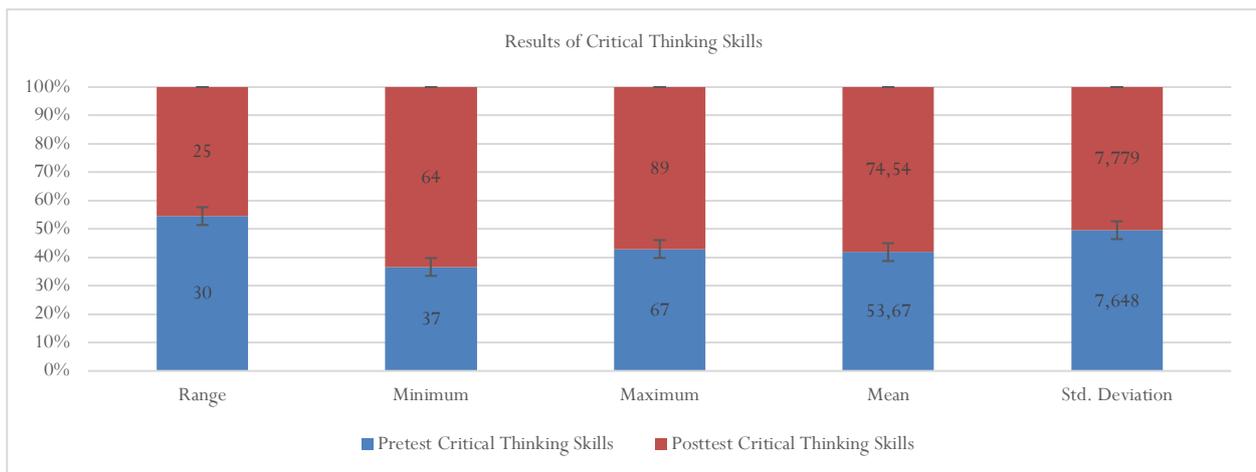| Result	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pretest Critical Thinking Skills	24	30	37	67	53.67	7.648
Posttest Critical Thinking Skills	24	25	64	89	74.54	7.779

Figure 1. Results of Critical Thinking Skills

Discussion

Based on the research results in tables 1 to 3, information is obtained at the stages of formulating problems, collecting data, and conducting analysis, as well as recapitulating learning outcomes using the dominant CTL method are in the sufficient category. The achievement of these results was better due to the fact that students were not used to participating in learning using CTL. CTL itself requires students to be able to think at a higher level while the learning that has been carried out so far has not fully encouraged students to think at a higher level. This is in line with the results of the study by Hassan (2016) which states that CTL supports students to learn and improve ideas so as to produce high-level and critical

thinking skills. It seems that CTL is unable to facilitate students with high-level and critical thinking skills. In addition, CTL is a relatively new strategy in the world of education so that understanding of the concept is further and more often applied (Shamsid-Deen & Smith, 2006).

It was further explained that CTL requires students to find information and knowledge on their own through activities such as observing, asking, explaining, designing, guessing, proving, analyzing, and closing. Thus, in the process of implementing CTL in learning, active collaboration is needed from lecturers and students (Suryawati et al., 2010; Glynn & Winter, 2004). Lecturers must be able to become facilitators in encouraging students to be active in learning and solving problems. This collaborative learning process makes learning more

meaningful for students. The learning process takes place naturally in the form of work activities and experiences, and not only the transfer of teacher knowledge to students (Munawaroh & Setyani, 2015).

Even though students' abilities at the three stages of CTL learning are still dominantly sufficient, the application of CTL is able to encourage students to learn, increase motivation to be active in learning, assist in developing assignments, assist in problem solving, provide ways to discuss and interact with their friends, and help summarize and reflect on lessons (Satriani et al., 2012). Through this learning process, students are encouraged to think critically, collaborate with colleagues in studying material, have creative abilities in solving a problem, and communicate ideas or concepts that have been obtained both orally and in writing.

Conclusion

CTL makes students to think critically, to collaborate with colleagues in studying the material, to have the ability to be creative in solving a problem, and to communicate ideas or concepts that have been obtained both orally and in writing. It happens because through CTL, there are a process of activating existing knowledge, activities to acquire and add new knowledge, a process of understanding and believing in the knowledge gained, a process of applying knowledge and experience possessed, and a reflection on knowledge development strategies. The weakness of the research that has been conducted is that the research design must use a one group post test design. This, of course, cannot provide a detailed description of the improvements that occur from the achievement of student learning outcomes using CTL. Thus, it is recommended to conduct more comprehensive research on the implementation of CTL in the learning process.

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Conflict of interests

The authors declare that they have no conflict of interest.

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