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The Influence of the Contextual Teaching and Learning Model on Student Learning Activities and Learning Outcomes on Ecosystem Material in Cluster II Sungai Penuh

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Abstract: This research is motivated by the fact that low learning activities also affect student learning outcomes in science learning in elementary schools. Students are less active in the learning process, both in expressing opinions, asking questions, and constructing their own knowledge. Students tend to wait for direction from the teacher, and only a few are actively involved in group discussions. One effort that can be done is to use the CTL learning model. This study aims to determine the effect of the CTL learning model on learning activities and student learning outcomes in the ecosystem material in cluster II Sungai Penuh.The type of research used Is Quasi Experimental. The research population was students of Elementary School Cluster II Sungai Penuh. The sample of this research was students of class Va SDN 025/XI Gedang Village Sungai Penuh as the experimental class and students of class Vb SDN 001/XI Sungai Penuh as the control class. The instruments used in this research were learning activity questionnaires and learning outcome test sheets. The data analysis technique used prerequisite tests in the form of normality and homogeneity tests. Meanwhile, to test the hypothesis using an independent t test. To determine the relationship between learning activities and learning outcomes, a correlation test was carried out. The results of this study indicate that there is an influence of the CTL learning model on learning activities and student learning outcomes on ecosystem material in cluster II of the full river. The details of the data analysis results are: (1) The CTL learning model improves student learning outcomes by linking lesson materials to everyday life so that concepts are easier to understand, as evidenced by the results of the study which obtained a significance value of 0.000 for the posttest. By taking a significance value of 5%, it is concluded that H0 of this study is rejected, while H1 is accepted, meaning that there is an influence of the CTL learning model on student learning activities. (2) The CTL learning model improves student learning activities, as seen from active involvement in discussions and completing assignments, as evidenced by the results of the study which obtained a significance value of 0.000 for the posttest. By taking a significance value of 5%, it is concluded that H0 of this study is rejected, while H1 is accepted, meaning that there is an influence of the CTL learning model on student learning outcomes. (3) There is an influence of learning activities on student learning outcomes by using the CTL learning model. This increase in learning activities contributes to an increase in learning outcomes, showing a positive influence between the two.

Keywords: Contextual teaching and learning; Ecosystem; Learning activities; Learning outcomes

Introduction

Education is a means to improve and develop the quality of Human Resources (HR). One effort to improve the quality of education is by improving the learning process. Learning is essentially a reciprocal relationship between teachers and students. Teachers are required to be patient and open-minded, in addition to being able to

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navigate more active learning situations (Arifianti et al., 2020). In Indonesia, basic education plays a crucial role in shaping the foundation of students' knowledge, attitudes, and skills. According to Rama et al. (2023), education is a conscious effort to acquire abilities through the learning process to achieve a person who is religious, has character, is intelligent, has morals, and is competent for society and the nation. Education is a learning process that shapes a person who has meaning in their life. This process helps individuals develop the abilities, attitudes, and skills necessary to adapt and interact effectively with changes and challenges in their environment (Islamiati et al., 2024).

In elementary education, science learning plays a crucial role in improving the quality of education, particularly in producing a quality generation, namely individuals with critical, logical, creative, innovative, and globally competitive thinking skills. Science learning is also expected to be the primary foundation of education, providing students with a deeper understanding of science contextually and its application in their daily lives (Irsan, 2021). However, the implementation of science learning in elementary schools often faces various challenges, both in terms of teaching methods and the tendency of students to be passive and uninterested in learning.

In the Independent Learning Curriculum (KMB), the science learning content is packaged in a learning content called IPAS (Natural and Social Sciences). Indonesia has begun implementing the independent learning curriculum accompanied by the industrial revolution 4.0 towards Society 5.0 which requires teachers to be more responsive and creative and innovative in implementing learning (Taupik et al., 2023). The independent curriculum itself focuses more on student character and morals by implementing the Pancasila profile as regulated in Permendikbud No. 22 of 2022 concerning the Ministry of Education and Culture's strategic plan for 2020-2024 (Cholilah et al., 2021; Santoso et al., 2023). The learning concept in the Independent Learning Curriculum is based on four principles, namely: (1) student-centered learning; (2) competency-based learning; (3) contextual and relevant learning; (4) holistic and integrative learning.

Although the independence curriculum has introduced a more innovative and relevant approach, the implementation of science learning in elementary schools still faces various challenges. One of the problems that often arise in science learning in elementary schools is the low level of learning activity and teachers' ability to apply learning models, which leads to low student learning outcomes. As revealed in research (Purwanti, 2022), low student learning outcomes can be explained by several reasons, one of which is the low level of learning activity in the classroom. Teachers often use monotonous learning models, such as lectures and assignments, without utilizing innovative learning models. The learning models applied are not able to help students process information optimally during the learning process. As a result, most students achieve learning outcomes below the Minimum Competency (KKM).

Based on interviews conducted between August 12 and 23, 2025, during science lessons at SDN Gugus II Kota Sungai Penuh, students' learning activity in science was relatively low. This was evident in the lack of student engagement in asking questions or expressing opinions after the material was presented. Students tended to wait for teacher direction, and only a few actively participated during practical work or group discussions. Passive students appeared to rely more on their group mates than to participate independently. Several factors contributing to low student learning activity include a lack of understanding of the material presented, which leads to a tendency to be passive in the learning process. A lack of self-confidence also inhibits students from asking questions or expressing opinions, while an unsupportive classroom environment can hinder student engagement. Furthermore, many students are more comfortable waiting for direction from the teacher than thinking independently or actively participating in discussions. Teachers also still use traditional learning models, such as lecturing in front of the class, followed by assignments that are then discussed together. Science learning is difficult to implement using the lecture method because this subject involves thinking skills, working skills, scientific attitudes, and communication skills (Barus, 2022). Therefore, it is necessary to find alternative learning models that can more actively engage students in the teaching and learning process.

Learning activities are the core of the educational process in schools. Whatever activities students undertake to become better at learning and understanding a learning material, they are said to be carrying out learning activities (Mawadati et al., 2023), so it can be understood that learning activities are very important for science competency because student activeness in learning is the main tool for students to achieve an education. So if there are no learning activities, the learning process will not take place well, as students are less active in teaching and learning activities. The student learning activities that researchers studied were through visual activities (paying attention to teacher explanations, observing students reading and presenting), oral activities (presenting assignment results, asking questions), listening activities (listening to discussions, listening to teacher explanations), writing activities (making summaries), motor activities (conducting experiments, organizing games), mental

activities (actively participating in class, answering questions/solving problems), emotional activities (emotional activities (confidently asking questions) (Qibtiyah et al., 2022).

The science learning process in Cluster II Sungai Penuh generally faces various weaknesses that hinder the optimal achievement of learning objectives. One major weakness lies in the still-conventional learning approach. Many teachers still use the lecture method as the primary strategy for delivering material. Students simply listen and take notes without being given sufficient opportunities to discover, investigate, or connect science concepts to phenomena occurring in their surroundings. This results in students being passive, lacking direct engagement, and lacking meaningful learning experiences.

To address these issues, innovative learning models are needed that can improve student learning activities and outcomes in science learning. One alternative model that can improve learning activities and outcomes is the CTL model. The theory proposed by Welerubun et al. (2022) states that the CTL learning model has a close relationship with student learning outcomes because the CTL model helps teachers relate the material taught to students' real-world situations and encourages students to make connections between their knowledge and its application in their daily lives. The CTL learning model can improve student learning outcomes with a learning atmosphere that prioritizes collaboration and encourages students to apply critical and creative thinking to everyday life (Astuti et al., 2019). Meanwhile, according to Rezeki et al. (2022), who stated that CTL can improve learning outcomes because learning is carried out in a meaningful context for students. When students understand the relevance of the material to their lives, learning motivation increases and conceptual understanding becomes deeper. This is supported by the opinion of Bahtiar et al. (2022), who stated that learning outcomes will be optimal if students are actively involved in discovering and constructing their own knowledge, as the main principle in CTL. Thus, the higher the student's learning activity in contextual learning, the greater their opportunity to achieve maximum learning outcomes. Therefore, it can be concluded that the CTL model has a close and positive relationship with student learning activities and learning outcomes, because through real and meaningful learning experiences, students are encouraged to learn actively and are able to achieve a deeper understanding of the material being studied.

The CTL learning model also has a close relationship with student learning activities because it can increase student activeness by emphasizing the process of full student involvement during learning activities (Dewi et al., 2019). According to Sunaryoto (2022), CTL is a learning concept that helps teachers connect subject matter with students' real-world situations, thereby encouraging them to connect their knowledge with applications in everyday life. This contextual learning process directly fosters student learning activities, because they do not only receive information passively, but actively seek, discover, and construct their own knowledge. This is in line with the opinion of Ayuningsih et al. (2025), who stated that CTL emphasizes full student involvement in learning, both physically and mentally, so that learning activities become more meaningful. In contextual learning, students are encouraged to interact, discuss, and collaborate in groups, which indirectly increases their participation and involvement in the learning process. A more enjoyable learning atmosphere by linking existing learning materials to students' daily lives can encourage students to express their opinions so that in this learning, students can also be more active in learning (Rahmi Fuadi et al., 2016).

The CTL learning model aims to help students understand the meaning of the learning material and relate it to their daily lives. This is in line with the opinion of Ahrisya et al. (2019) who stated that the contextual learning model of the CTL learning model allows students to relate the material presented to their real lives, allowing them to apply the knowledge they possess to their daily lives.

The CTL learning model is a cooperative learning model that uses small groups of students to work together to connect the material being taught to real situations and encourages students to make connections between the knowledge they have and its application in their lives. This learning actively involves students in constructing their own knowledge, in this case students will build their own knowledge through active involvement in the learning process, linking learning materials to real life, learning according to student needs, emphasizing problem solving, emphasizing students to monitor their learning (self-reflection), emphasizing critical and creative thinking skills to collect data and solve problems, and using authentic assessments (Pusparina, 2021). This is in accordance with research Saffan (2025) which states that the CTL model has the following advantages: 1) Provides freedom for students to be creative according to their potential, so that students are actively involved in PBM, 2) Students can think critically and creatively in collecting data, understanding an issue contextually and solving problems according to their daily experiences 3) Selection of information based on student needs is not determined by the teacher, 4) Helps students work effectively in groups, 5) Forms a good cooperative attitude between individuals and groups.

Contextual learning occurs when students apply and experience what is being taught with reference to real-world problems related to their roles and responsibilities. Contextual learning is learning that occurs in close connection with actual experiences. CTL emphasizes higher-level thinking, cross-disciplinary knowledge transfer, and the collection, analysis, and synthesis of information and data from various sources and perspectives (Wahyuni, 2016). In line with the opinion of Rezeki et al. (2022), the CTL model engages students in important activities that help them connect academic lessons to the real-life contexts they face. By connecting the two, students see meaning in the material learned in school. Students can discover meaning in the subject matter when they actively select, organize, organize, touch, plan, investigate, search for information, and draw conclusions from their own activities. The results of research conducted by Widyaiswara et al. (2019) showed that implementing the CTL model can significantly improve student learning activities and achievement.

Through the application of the CTL learning model, it is expected to improve learning activities and student learning outcomes, because this model provides opportunities for students to relate subject matter to real experiences in everyday life. CTL emphasizes the importance of meaningful learning, where students do not only receive information passively, but are also actively involved in the process of discovering, discussing, and solving problems relevant to their environment. Thus, the application of CTL can foster learning motivation, develop critical thinking skills, and strengthen in-depth conceptual understanding. In addition, learning that is linked to an authentic context makes students more enthusiastic and responsible for their learning activities, thus having positive implications for improving student activities and learning outcomes. Based on the problems above, the researcher is interested in conducting a research study with the title "The Effect of the CTL Learning Model on Student Learning Activities and Learning Outcomes on Ecosystem Material in Cluster II Sungai Penuh".

Method

The research used by the researcher is quantitative research. Data in quantitative research are in the form of numbers and analysis using statistics (Sugiyono, 2020). The research method chosen is an experimental method using a quasi-experimental design. Quasi-experimental design is often referred to as a quasi-experiment. This method is considered a type of development of the true experimental design, because it still involves the manipulation of variables, but does not fully control all external variables that might affect the research results. Sampling was taken using a "random sampling" technique. Cluster Random Sampling is a sampling technique in which the population is divided into small groups called "clusters," then several clusters are randomly selected to be sampled.

The instrument used in this study was a questionnaire. A questionnaire is a technique or method of indirect data collection where the researcher does not directly ask questions to respondents (Sudaryono, 2021). Furthermore, a test sheet, a test sheet as a data collection instrument, is a series of questions or problems used to measure the skills, knowledge, intelligence, abilities, or talents possessed by individuals or groups (Sudaryono, 2021). The data collection technique in this study was interviews. To collect initial data, the researcher used data collection techniques through interviews. The data analysis technique in this study was a t-test, which was conducted after the prerequisite tests for t-test analysis were met.

Result and Discussion

Information on student learning activities was collected through pretest and posttest data in the form of a questionnaire consisting of 30 questions for both the control and experimental classes. The questionnaire was compiled based on 14 learning activity indicators: reading, comparing, asking questions, interrupting, listening, discussing, compiling reports, copying, conducting experiments, playing, responding, solving problems, showing interest, and being serious (Qibtiyah et al., 2022).

Table 1. Student Learning Activity Data

	Control		Experiment	
	Pretest	Posttest	Pretest	Posttest
Amount	2246.7	2627.5	1805.8	2338.3
Mean	72.47	84.76	72.23	93.53

Table 1 shows that the average pre-test score for student learning activities in the control class was 72.47, which falls into the poor category. Meanwhile, the average pre-test score in the experimental class was 72.23, which falls into the very poor category. After implementing the CTL learning model, there was a significant increase in post-test scores in both classes. In the control class, the average post-test score for student learning activities increased to 84.76, which falls into the good category. Meanwhile, in the experimental class, the average post-test score also increased to 93.53, which falls into the very good category.

Information on learning outcomes was collected through pre-test and post-test data in the form of objective multiple-choice questions arranged according to a question grid, with a total of 10 test questions.

Table 2. Student Learning Outcomes Data

	Control		Experiment	
	Pretest	Posttest	Pretest	Posttest
Amount	1380	2240	1260	2230
Mean	44.52	72.26	50.40	89.20

Table 2 shows that the average pretest score for student learning outcomes in the control class was 44.52. Meanwhile, the average pretest score for student learning outcomes in the experimental class was 50.40. These data indicate that before the treatment, student learning outcomes in both classes were still relatively low. After the implementation of the learning, there was a visible improvement in the posttest scores in both classes. The average posttest score for student learning outcomes in the control class increased to 72.26. Meanwhile, in the experimental class, the average posttest score reached 89.20.

Hypothesis testing used an Independent Sample t-test to determine whether there were differences in student learning motivation and problem-solving abilities in Mathematics learning between the control and experimental groups. The Independent Sample t-test uses a significance value to make decisions. If the significance value is less than 0.05, H0 is rejected and H1 is accepted.

Table 3. Independent Sample t-TestLearning Activities

	Sig. (2-tailed)
Learning Activities	0.000

Table 3 shows the results of the independent samples t-test of learning activities against the post-test data above, with a Sig. value of 0.000 < 0.05, which means there is a difference in the learning activities of students in the control class and students in the experimental class after the learning process. Thus, it can be concluded that the alternative hypothesis (H_1) in this study is accepted, while the null hypothesis (H_0) is rejected. These results indicate that the use of the CTL model has a significant effect on student learning activities in science learning.

Table 4. Independent Sample t-Test Learning Outcomes

	Sig. (2-tailed)
Learning outcomes	0.000

Table 4 shows the results of an independent samples t-test on the post-test data on student learning outcomes, with a significance value of 0.000 < 0.05. These results indicate a significant difference between student learning outcomes in the experimental and control classes after the learning implementation. Considering the t-test results for both the pre-test and post-test data, it can be concluded that the alternative hypothesis (H_1) is accepted and the null hypothesis (H_0) is rejected. This means that the CTL model significantly influences student learning outcomes in science.

A correlation test was conducted to determine the relationship between student learning activities and learning outcomes.

Table 5. Correlation Test

		Correlations	
		Learning Activities	Learning outcomes
Learning Activities	Pearson Correlation	1	.586
	Sig. (2-tailed)		.002
	N	25	25
Learning outcomes	Pearson Correlation	.586	1
	Sig. (2-tailed)	.002	
	N	25	25

Table 5 shows that the calculation using product moment correlation analysis obtained a sig value (2-tailed) of 0.002 < 0.05. This indicates that there is a significant influence between student learning activities and student learning outcomes using the CTL learning model on ecosystem material in cluster II of the full river. Meanwhile, the Pearson Correlation value between student learning activities and learning outcomes is 0.586. To determine the strength or degree of evenness of the influence between variable X (learning activities) and variable Y (learning outcomes) can be seen from the correlation coefficient. The following is the calculation of the coefficient of determination:

KD = r x 100%

KD = 0.586 x 0.586 x 100%

KD = 34.3%

The correlation (r) obtained was 0.586, and the percentage influence of variable X (learning activity) on variable Y (learning outcome), or the coefficient of determination ($r2$), was 0.586 (34.3%). Based on the coefficient of determination ($r2$) of 0.586, it can be interpreted that the influence of learning activity on learning outcome was 34.3%, with 65.7% influenced by other variables outside the study.

The above test revealed a significance level of 0.002 < 0.05, indicating a positive and significant influence between student learning activity and learning outcome

using the CTL learning model on ecosystems in cluster II of Sungai Penuh.

The N-gain test was conducted to determine the extent of improvement between before and after treatment between the two sample groups. Table 5 shows the results of the percentage of Student Learning Motivation as follows:

Table 6. N-gain Test of Student Learning Activities

	Group	Mean	Std. Error
N-gain Percentage	Control	0.447	
	Experiment	0.757	

Table 6 shows the results of the N-gain percentage test with an average N-gain percentage for the control group of 44.7% which is included in the medium category, while the average N-gain percentage for the experimental group was 75.7% which is included in the high category.

Table 7. N-gain Test of Student Learning Outcomes

	Group	Mean	Std. Error
N-gain Percentage	Control	0.505	
	Experiment	0.785	

Table 7 shows the results of the N-gain percentage test with an average N-gain percentage for the control group of 50.5% which is included in the medium category, while the average N-gain percentage for the experimental group was 78.5% which is included in the high category.

The Influence of the CTL Learning Model on Student Learning Activities.

Learning activities are both physical and mental activities undertaken by students during the learning process. The more actively students are involved in learning, the greater their chances of understanding the material and achieving optimal learning outcomes. In this study, student learning activities were observed through several indicators: reading, comparing, asking questions, interrupting, listening, discussing, writing reports, copying, conducting experiments, playing, responding, solving problems, showing interest, and engaging in activities.

Based on the results of the independent samples t-test, the Sig. 2-tailed pretest value was 0.900 > 0.05, so there was no difference in the average learning activity between the experimental class and the control class before treatment. However, the test results on the posttest showed a Sig. 2-tailed value of 0.000 < 0.05, which means there was a significant difference in learning activity between the two experimental classes after being given treatment. This can be seen from the average learning activity of students in the experimental class increased from 72.23 to 93.53, while in the control class it only increased from 72.47 to 84.76.

This opinion aligns with Paratiwi et al. (2023), who stated that learning activities are a crucial aspect of learning, emphasizing meaningful learning activities will lead students to a memorable learning experience. Learning activities can actively engage students in learning, enabling them to solve problems and think critically, leading to improved learning outcomes. Another opinion Lona (2019) states that effective learning activities encourage students to think, ask questions, and solve problems during learning. This process allows students not only to receive information but also to actively process it. Active learning helps strengthen memory and conceptual understanding. When students are directly involved, learning becomes more meaningful, positively impacting student learning outcomes.

The Influence of the CTL Learning Model on Student Learning Outcomes

Learning outcomes are changes in students' abilities after participating in the learning process. These changes encompass aspects of knowledge, attitudes, and skills acquired through learning experiences. Learning outcomes indicate the level of student success in achieving established learning objectives. Furthermore, learning outcomes also serve as an indicator of the effectiveness of the learning process and model used by teachers.

Based on the results of the independent samples t-test, the Sig. 2-tailed pretest learning outcomes value is 0.306 > 0.05, which indicates there is no difference in the average learning outcomes between the experimental class and the control class before treatment. The improvement in student learning outcomes in the experimental class is clearly visible both from the results of quantitative data and observations of student learning outcomes. The average student learning outcomes in the experimental class increased from 50.40 to 89.20, while in the control class it only increased from 44.52 to 72.26.

The CTL learning model effectively improves student learning outcomes because it connects subject matter to students' real-life contexts, making learning more meaningful. Furthermore, CTL encourages active student engagement through discovery, questioning, and discussion activities, which help students understand concepts more deeply and sustainably. Research conducted by Taufik (2019) found that the CTL learning model effectively improves student learning outcomes because it provides students with opportunities to learn through direct experience and social interaction. Learning does not only focus on memorization, but on applying concepts in real situations, so students are able to connect new

knowledge with existing knowledge. This condition makes it easier for students to understand the material, increases self-confidence, and encourages responsibility in learning. As a result, student understanding improves and learning outcomes improve significantly. Meanwhile, Sriariati (2019), in their research at the junior high school level, found that students who participated in learning using the CTL learning model achieved higher average learning outcomes compared to control classes using conventional models. The average score for the experimental class reached 82, while the control class only scored 68. This indicates that the CTL learning model is effective in encouraging students to think critically and actively in solving problems independently.

The Influence of Learning Activities on Student Learning Outcomes Using the CTL Learning Model

The influence of learning activities on elementary school student learning outcomes in this study was determined through a correlation test. The test results yielded a significance value of 0.002 < 0.05, indicating a significant relationship between learning activities and learning outcomes. Furthermore, Table 4.11 shows a positive correlation between learning activities and learning outcomes using the CTL learning model in science learning. This means that the higher the student's learning activities, the higher the learning outcomes. Conversely, the lower the student's learning activities, the lower the learning outcomes. In conclusion, there is a significant influence between learning activities and student learning outcomes using the CTL learning model in fifth-grade science learning. Learning activities are an important element in supporting the development of students' thinking skills, because through active involvement in the learning process, students have the ability to observe, ask questions, explore, solve problems, and conclude information independently. Several studies have shown the influence of increased learning activities on student learning outcomes. Harahap (2024) revealed that increased student learning activities significantly impacted improved student learning outcomes, where students became more involved in discussions, able to ask questions, and actively expressed opinions. The same thing was emphasized by Benge (2017), who found that when student learning activities increased from meeting to meeting, student learning outcomes also consistently increased. Similarly, in the findings Karina et al. (2017), high learning activities were proven to be in line with increased student courage in expressing opinions, analyzing information, and drawing logical conclusions.

Meanwhile, according to Sopwan (2022), student learning activities using the CTL model have a positive influence on learning outcomes. Through CTL, students are actively involved in contextual and relevant activities related to everyday life, such as discussions, experiments, and projects, thus deepening their understanding of the material. These intensive and meaningful activities encourage students to think critically, solve problems, and collaborate, which in turn improves learning outcomes. In addition, the connection between learning and real-life experiences increases motivation and interest in learning, resulting in higher student participation in each learning activity and more optimal learning outcomes. Another opinion Astiti (2017) states that high student learning activities in the CTL model, through involvement in contextual and relevant activities, have a positive influence on learning outcomes. Activities such as discussions, experiments, and problem-solving improve students' focus, motivation, and critical and creative thinking skills. With increased learning activity and motivation, conceptual understanding becomes deeper, so that student learning outcomes also improve significantly.

Conclusion

Based on the research results that have been presented, it can be concluded that (1) there is an influence of the Contextual Teaching and Learning learning model on student learning activities on ecosystem material in cluster II Sungai Penuh, (2) there is an influence of the Contextual Teaching and Learning learning model on student learning outcomes on ecosystem material in cluster II Sungai Penuh, (3) There is a significant influence between learning activities on student learning outcomes using the Contextual Teaching and Learning learning model on ecosystem material in cluster II Sungai Penuh.

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