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The effectiveness of contextual teaching and learning (CTL) with the ICARE model assisted by GeoGebra in terms of students' computational thinking ability

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Abstract: This study aims to: (1) determine the effectiveness of Contextual Teaching and Learning (CTL) learning with ICARE model assisted by Geogebra in term of students' computational thinking ability; (2) determine the effectiveness of Direct Instruction learning in term of students' computational thinking ability; and (3) determine the effectiveness of CTL learning with ICARE model assisted by Geogebra compared to Direct Instruction learning in term of students' computational thinking ability. This study employed quasi-experiment research with pretest-posttest control group design. This research was conducted in one of the high schools in Yogyakarta. The instruments used in this study were computational thinking ability tests and study implementation observation boards. The results show that: (1) Contextual Teaching and Learning, learning with ICARE model assisted by Geogebra is effective in terms of students' computational thinking ability with an average test score of 84,36 and classical completeness of 85,29%; (2) Direct Instruction learning is not effective in terms of students' computational thinking ability with an average test score of 76,23 and classical completeness of 60,00%; and (3) Contextual Teaching and Learning, learning with the ICARE model assisted by GeoGebra is more effective than Direct Instruction learning in terms of students' computational thinking.

Keywords:
Computational ability, Contextual teaching and learning, ICARE model

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1. Introduction

Education in the 5.0 era emphasizes learning oriented towards developing 21st-century competencies and skills, such as problem-solving, creativity, collaboration, critical thinking, and systematic thinking (Hakiki, M. & Fadli, 2021). Mathematics learning is an appropriate means of developing the ability to think logically when solving problems (Ernest, 1991; Shapiro, 1997). Mathematics education needs to be provided to all students to equip them to think logically, analytically, systematically, critically, and creatively (Velazquez, 2005). Mathematics learning should be interactive, challenging, motivating, fun, and meaningful (Gusteti, 2022). Teacher competence must be reliable throughout the learning process,

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including in determining learning methods or models that actively involve students (Mastur & Zainuddin, 2023; Sunzuma & Maharaj, 2019). The selection of the right learning method or model will be very influential in determining the success of learning.

The application of mathematics learning through Contextual Teaching and Learning (CTL) can actively involve students in the learning process. CTL learning trains learners to think critically and creatively when collecting data, understanding problems, and finding solutions (Ngurah et al., 2024; Reyes et al., 2019; Rubel & McCloskey, 2021). CTL develops learners' ability to think logically and solve problems rationally, thereby training them in the process of analysis (Fernández & Ortiz Galarza, 2023; Ramadhani et al., 2023). CTL can be maximized using the ICARE learning model: Introduction, Connection, Application, Reflection, and Extension. The ICARE learning model emphasizes a gradual learning process that starts with understanding concepts, connecting them to prior experience or knowledge, applying them in real life, evaluating understanding, and developing knowledge through new challenges. The application of the ICARE model in learning provides opportunities for students to build their own knowledge and draw conclusions from the subject matter, making learning more meaningful and helping them grasp its essence (Mawaddah & Usmeldi, 2024; Simamora et al., 2024). The application of the ICARE model fosters meaningful learning that builds a comprehensive understanding and develops students' thinking skills (Mawaddah & Usmeldi, 2024; Simamora et al., 2024).

In addition to the selection of learning approaches, the use of appropriate media can support learning in improving students' computational thinking skills. One of the learning media that can be utilized in learning mathematics is GeoGebra. The use of GeoGebra in learning has a positive effect on improving students' mathematical communication skills, understanding of mathematical concepts, mathematical reasoning, mathematical problem-solving, and mathematical connections (Suciati & Mailili, 2022). GeoGebra facilitates learners' understanding of mathematical concepts through exploratory visual experiences and connections between analytical and visual representations (Jelatu, S., & Ardana, 2018; KÜÇÜK & GÜN, 2023). The purpose of mathematics in the Education Standards, Curriculum and Assessment Agency Number 32 of 2024 concerning learning outcomes in the Merdeka Curriculum is to equip students with the ability to: (1) mathematical understanding; (2) mathematical reasoning and proof; (3) mathematical problem solving; (4) mathematical communication and representation; (5) mathematical connections; and (6) mathematical disposition. This suggests that thinking skills and problem-solving ability are fundamental elements of 21st-century mathematics learning. Computational thinking ability is one of the competencies that must be developed, as it can be used as an approach to problem solving (Budiarti et al., 2022).

In simple terms, computational thinking is a systematic process for simplifying large or complex problems into simpler ones and solving them in a practical way (Lestari & Ma, 2020). The ability to think computationally is important for students in the 21st century because, through this process, problem-solving focuses not only on solving problems but also on how to solve them (Maharani et al., 2019). Mastery of computational thinking skills is very important for solving real-world problems (Simanjuntak et al., 2024). The integration of computational thinking in schools has been carried out by several countries in the world (Waterman, Kevin P; Goldsmith, Lynn; & Pasquale, 2020). In Indonesia, computational thinking is integrated into the curriculum through the learning process, including mathematics (Anggraena, 2021). Mathematics is the right scientific field for developing computational thinking skills because it trains students to think logically when solving problems (Kneebone, 1963; Meyer, 2010; Nugroho, 2024; Purwitaningrum & Prahmana, 2021). In fact, most of the mathematics learning process in Indonesia has not been oriented towards computational thinking skills (Veronica et al., 2022). This is because teachers' and students' understanding of computational thinking skills is still very low (Putra et al., 2022; Ye et al., 2023). This condition is evidenced by previous studies that indicate students' computational thinking skills remain categorized as low or below average (Angeli & Giannakos, 2020; Basu et al., 2016; Harangus & Kátai, 2020; Purwasih et al., 2024).

The Programme for International Student Assessment (PISA), organized by the Organization for Economic Co-Operation and Development (OECD), states that there is a reconstruction in the PISA 2022 framework in the form of the inclusion of aspects of computational thinking, mathematical reasoning, and 21st century competencies in problem-solving as an effort to deal with technological and information developments (OECD, 2017, 2022, 2023). Indonesia's PISA 2022 math achievement score was 366, still far below the average international score of 472. This math score shows a picture of students' low computational thinking ability in Indonesia. The content used in PISA reflects mathematics in the school curriculum, including: 1) change and relationships; 2) space and shape; 3) quantity; and 4) uncertainty and data. The content of change and relationships, mathematically, means modeling mathematical changes and relationships using appropriate functions and equations, as well as converting symbolic representations to graphical forms and vice versa. This means that the content of change and relationships is related to the branch of mathematics, namely algebra.

The Education Standards, Curriculum, and Assessment Agency Number 32 of 2024 concerning Learning Outcomes in the Merdeka Curriculum in the mathematics subject section states that algebra is one of the elements that students learn in phase E. One of the materials in this element is the quadratic function. However, students often consider quadratic function material difficult because of its unreal representation and contains symbols and variables (Kusumawati et al., 2024). This is due to the lack of understanding of the concept of the quadratic function and the pattern of thinking that is still wrong about the quadratic function material. This fact shows that the ability to think systematically is needed by students in learning the material. The application of contextual learning that relates material to real situations can encourage students to be active in the thinking process (Yang, H., Shao, Y., Liu, Y., Dong, J., Li, Q., & Chen, 2024). The application of CTL combined with the GeoGebra-assisted ICARE model provides a contextual and meaningful learning experience for students. Learners are encouraged to be actively involved in a series of structured learning activities and understand material concepts more deeply through interactive visualization and exploration.

To measure the effectiveness of applying CTL combined with the ICARE model and GeoGebra assistance, a comparison is needed. In this study, a control class was used to apply Direct Instruction. The selection of Direct Instruction is based on its widespread use by teachers in schools. According to Nugroho et al. (2024), Direct Instruction learning plays an important role in providing a strong foundation in basic theories and formulas, ensuring that all learners gain an accurate understanding.

Based on the explanation above, it is necessary to conduct research to determine the effectiveness of Contextual Teaching and Learning (CTL) with the ICARE model, assisted by GeoGebra, and Direct Instruction learning in terms of students' computational thinking skills.

2. Methods

2.1 Research Approach

This study used quasi-experimental research with a pretest-posttest control group design. The research was conducted by providing learning activities to both the experimental and control classes. Initially, both classes will be given a pretest to assess the students' initial abilities. Furthermore, the experimental class received instruction using Contextual Teaching and Learning (CTL) with the ICARE model, assisted by GeoGebra, while the control class received instruction using Direct Instruction. At the end, both classes will be given a posttest to assess the effectiveness of the treatment.

2.2 Population and Sample

The population in this study was all 10th-grade students of SMA Negeri 6 Yogyakarta in the even semester of the 2024/2025 school year. The sample in this study consisted of two classes. Class 10 E3 as experimental class that received learning with Contextual Teaching and Learning (CTL) with the ICARE model assisted by GeoGebra, while Class 10 E1 as control class that received learning with Direct Instruction. This research was conducted on experimental and control classes that had the same initial ability.

2.3 Research Instrument

The computational thinking ability test was administered to obtain data on students' computational thinking ability in the experimental and control classes. The computational thinking ability test was conducted twice, namely, pretest and posttest. A pretest was conducted to assess students' computational thinking ability before instruction in the experimental and control classes, while a posttest was conducted to assess it after instruction. This test was structured around aspects of computational thinking ability (see Table 1).

The pretest and posttest instruments for computational thinking ability were administered to the experimental class to determine their reliability. Based on the categorization using Guildford's criteria (Novikasari, 2016), the reliability of the pretest instrument was 0.837, placing it in the high category, and the posttest instrument was 0.706, also in the high category. It means the test instruments were reliable.

Table 1. Indicator of Computational Thinking Ability Test

Aspect	Indicator
Decomposition	Identify and decompose information from a given problem so that it becomes simpler.
Abstraction	Identifying important information from the problem and eliminating information that is not needed to plan problem-solving.
Generalization	Mentioning the general form of the problem is used to solve the problem.
Algorithm	Mentioning systematic steps to find a solution to the problem.
Debugging	Checking a statement with the right steps and conclusions.

The learning implementation observation sheet was used to measure the implementation of learning procedures in the experimental and control classes. The learning implementation observation sheet consists of two types, namely the learning implementation observation sheet in the experimental class, which contains the learning steps of Contextual Teaching and Learning (CTL) with the ICARE model assisted by GeoGebra, and the Direct Instruction learning implementation observation sheet in the control class, which contains Direct Instruction learning steps. The learning implementation observation sheet was filled in by the observer, with an alternative answer of "Yes" if the observed aspects were carried out and "No" if they were not.

2.4 Data Analysis

Descriptive analysis is used to represent data from pretest and posttest results of students' computational thinking skills in experimental and control classes. The results of the data obtained will be described using statistical techniques, namely the lowest value, the highest value, the average, and the standard deviation.

The effective criteria used in this study, namely (1) the average value of the computational thinking ability test of students reaches the value criteria, which is at least 75; (2) classical completeness reaches 80%; and (3) the average posttest value of computational thinking ability of students who get Contextual Teaching and Learning (CTL) learning with ICARE model assisted by GeoGebra is higher than students who get Direct Instruction learning.

Inferential analysis was also used to analyze data on students' computational thinking ability. Data analysis used to test the hypothesis of this study were one sample T-test, a binomial test, and an independent sample T-test.

3. Results and Discussion

3.1 Learning Implementation

The implementation of learning in this study was observed directly by the observer. During the research process, the observer observed the implementation of learning by filling in the learning implementation observation sheet. The purpose of using this observation sheet is to observe various aspects of ongoing learning activities. The observation sheet for the implementation of learning in the experimental and control classes differs. The learning implementation observation sheet for the experimental class includes the steps of Contextual Teaching and Learning (CTL) activities using the ICARE model, assisted by GeoGebra, while the control class includes the steps of Direct Instruction activities. The results of learning implementation in experimental and control classes are presented by Table 2.

Table 2. Learning Implementation Results

Learning Session	Percentage of Learning Implementation	
	Experimental Class	**Control Class**
2	100%	100%
3	100%	100%
Average	**100%**	**100%**

Based on Table 2, the average percentage of learning implementation in experimental and control classes reached 100%. This shows that learning in experimental classes, which used Contextual Teaching and Learning (CTL) learning steps with the ICARE model assisted by GeoGebra, and in control classes, which used Direct Instruction learning steps were implemented very well.

3.2 Students' Computational Thinking Ability

Based on the data from the pretest and posttest results, the development of students in computational thinking, the effectiveness of the learning methods used, and the need to adjust the teaching model for students. The pretest and posttest results in this study are presented in Table 3.

Table 3. Data on Pretest and Posttest Results of Students' Computational Thinking Ability

Description	Experimental Class		Control Class	
	Pretest	***Posttest***	***Pretest***	***Posttest***
Number of Students	34	34	35	35
Maximum Score	80.00	95.45	80.00	88.64
Minimum Score	20.00	70.45	20.00	61.36
Variance	246.79	55,34	176.84	49.35
Standard Deviation	15.71	7.44	13.30	7.02
Average	**50.74**	**84.36**	**45.00**	**76.23**

Based on the data in Table 3, the average pretest and posttest scores for students' computational thinking skills in the experimental class are higher than those in the control class. The increase in the average pretest and posttest values in the experimental class was 33.62, while in the control class it was 31.23. In addition, the average posttest result of students' computational thinking ability in the experimental class was 84.36, while in the control class it was 76.23. Information on the acquisition of pretest and posttest scores on each aspect of computational thinking ability in experimental and control classes is presented in Table 4.

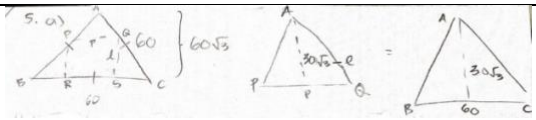
Table 4. Acquisition of Pretest and Posttest Scores for Each Aspect of Computational Thinking Ability

Aspect	Experimental Class				Control Class			
	Pretest		***Posttest***		***Pretest***		***Posttest***	
	$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%
Decomposition	1.62	40.4%	3.28	81.9%	2.77	69.3%	3.04	76.1%
Abstraction	1.99	49.6%	3.43	85.7%	1.41	35.7%	2.97	74.3%
Generalization	2.88	72.1%	3.60	90.1%	2.33	58.2%	3.59	89.6%
Algorithm	1.76	44.1%	3.30	82.6%	1.75	43.8%	2.70	67.6%
Debugging	1.82	45.6%	3.29	82.4%	1.24	31.1%	3.11	77.9%
Average	**2.01**	**50.4%**	**3.38**	**84.5%**	**1.90**	**47.6%**	**3.08**	**77.1%**

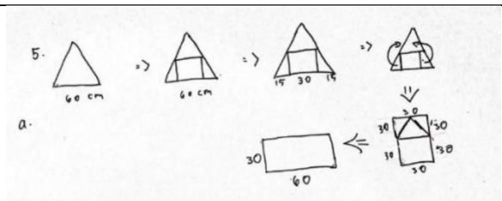
Description:
Minimum score for each aspect is 0
Maximum score for each aspect is 4
$\bar{x}$: average score on each aspect
% : percentage of score acquisition on each aspect

Based on the data in Table 4, the average pretest and posttest scores for computational thinking ability in the experimental class increased more than in the control class. The experimental class experienced an increase in the average pretest and posttest scores for computational thinking skills of 1.37, while the control class experienced an increase of 1.18.

Figure 1 are examples of students' posttest answers in the experimental and control classes in completing the computational thinking ability test on the decomposition.



(Experimental Class)

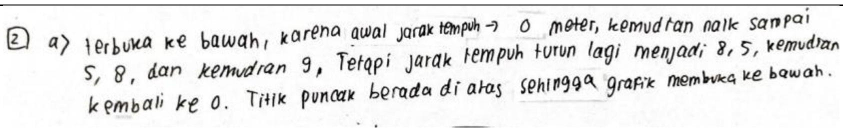


(Control Class)

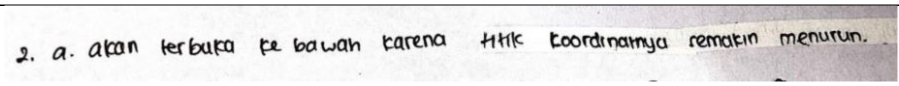
Figure 1. Example of Students' Answers of Decomposition Aspect

Based on the two answers in Figure 1, students in the experimental class can completely and correctly identify and decompose information from problems into simple illustrations, while students in the control class cannot decompose information from problems into simpler ones and make errors.

Examples of students' posttest answers in the experimental and control classes in completing the computational thinking ability test on the abstraction aspect are presented in Figure 2.



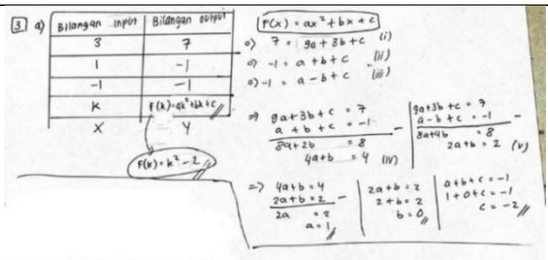
(Experimental Class)



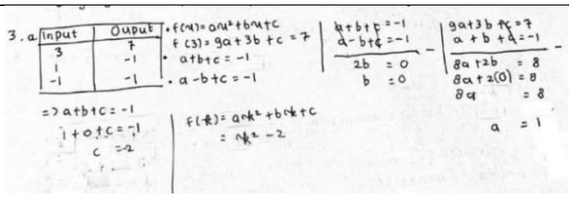
(Control Class)

Figure 2. Example of Students' Answers of Abstraction Aspect

Based on the two answers in Figure 2, it can be seen that students in the experimental class can identify important information from the problem and apply material concepts appropriately and obtain the right solution, while students in the control class do not identify important information from the problem and do not apply material concepts, although they obtain the right solution. Examples of students' posttest answers in the experimental and control classes in completing the computational thinking ability test on the generalization aspect are presented in Figure 3.



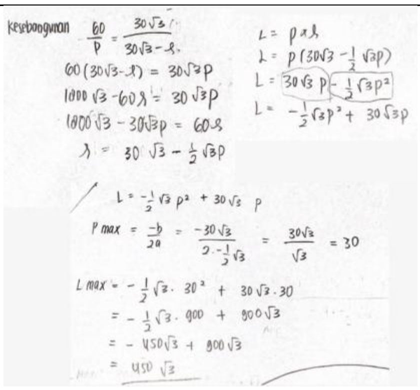
(Experimental Class)



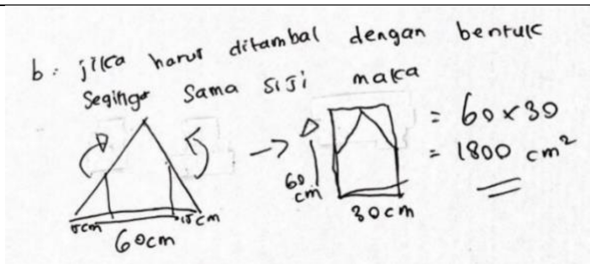
(Control Class)

Figure 3. Example of Students' Answers of Generalization Aspect

Examples of students' posttest answers in the experimental and control classes in completing the computational thinking ability test on the algorithm aspect are presented in Figure 4.



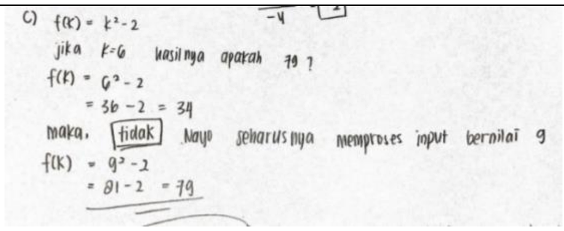
(Experimental Class)



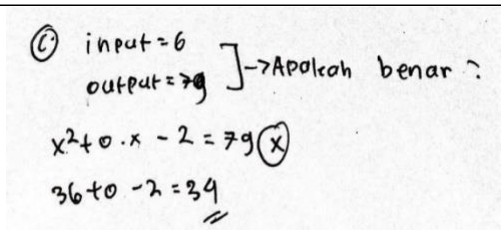
(Control Class)

Figure 4. Example of Students' Answers of Algorithm Aspect

Based on the two answers in Figure 3, students in the experimental and control classes can mention the pattern of the problem correctly, accompanied by precise and complete steps. Based on the two answers in Figure 4, students in the experimental class can correctly and completely list the steps for solving the problem, whereas students in the control class list incorrect steps. Examples of posttest answers from students in the experimental and control classes for the computational thinking ability test on the debugging aspect are presented in Table 5.



(Experimental Class)



(Control Class)

Figure 5. Example of Students' Answers of Debugging Aspect

Based on the two answers in Figure 5, it can be seen that students in the experimental class can check the statement with complete steps and are accompanied by the right conclusion, while students in the control class check the statement with incomplete steps and are not accompanied by a conclusion. Based on examples of students' answers in the experimental class, students demonstrate a fairly deep understanding. Although no learners obtained perfect scores, most showed good mastery in solving the questions according to the indicators set for each aspect. Meanwhile, based on examples of students' answers in the control class, students showed varied levels of achievement in computational thinking skills. Some of them were only able to meet some of the set indicators. In addition, achievement across aspects tends to be uneven, indicating that most learners in the control class have not fully met the set indicators.

The research was conducted with Pretest-Posttest Control Group Design which aims to: (1) determine the effectiveness of Contextual Teaching and Learning (CTL) learning with ICARE model assisted by Geogebra in terms of students' computational thinking ability on quadratic function material; (2) determine the effectiveness of Direct Instruction learning in terms of students' computational thinking ability on quadratic function material; and (3) determine the effectiveness of Contextual Teaching and Learning (CTL) learning with ICARE model assisted by Geogebra compared to Direct Instruction learning in terms of students' computational thinking ability on quadratic function material.

3.3 Effectiveness of Contextual Teaching and Learning (CTL) with ICARE Model Assisted by GeoGebra in Terms of Students'

Contextual Teaching and Learning (CTL) with the ICARE model assisted by GeoGebra is effective in terms of students' computational thinking ability on the quadratic function material. The criteria for the effectiveness of the first hypothesis is the average value of the computational thinking ability test of students in the experimental class reaches the value criteria, which is at least 75, and classical completeness reaches 80%.

The test was conducted using a One Sample T-test at a significance level of 0.05 and t_{table} of 2.035. The results show that the significance value of 0.000 is less than the significance level, and t_{value} of 7.414 is more than the t_{table}, indicating that H_0 is rejected.

This shows that the average computational thinking ability of students in the experimental class who received Contextual Teaching and Learning (CTL) learning with the ICARE model assisted by GeoGebra is not equal to 75 or higher than 75. Furthermore, in testing using a Binomial test at a significance level of 0.05. The result shows that the significance value of 0.000 is less than the significance level, so that H_0 is rejected. This shows that the classical completeness of the experimental class that obtained Contextual Teaching and Learning (CTL) learning with the ICARE model assisted by GeoGebra reached 80%. Therefore, the implementation of Contextual Teaching and Learning (CTL) learning with the ICARE model assisted by GeoGebra is effective in terms of students' computational thinking ability on the quadratic function material.

The application of Contextual Teaching and Learning (CTL) with the ICARE model assisted by GeoGebra is effective in terms of students' computational thinking skills on quadratic function material because the combination of approaches, models, and learning media creates structured, interactive, and exploration-based learning activities that strengthen students' thinking processes. Learners are accustomed to seeking and finding the concept of learning materials that train the ability to recognize and sort out important information from a problem. The full involvement of learners during the learning process encourages the formation of a deeper understanding so that mastery of material concepts is more meaningful. Deep mastery of concepts makes it easier for students to construct problem-solving appropriately. In addition, the implementation of learning that uses the principle of learning communities (in groups) creates collaborative learning. Learning activities encourage learners to collaborate with each other in building knowledge. Learners share their understanding in linking experiences with the material, discuss actively during exploration to construct understanding, work together in developing problem solutions, and evaluate the results of exploration together. Thus, through a collaborative and reflective learning process, learners are accustomed to detecting errors, analyzing them, and making improvements.

3.4 Effectiveness of Direct Instruction in Terms of Students’ Computational Thinking Ability

Direct Instruction learning is effective in terms of students' computational thinking ability on the quadratic function material. The criteria for the effectiveness of the first hypothesis is the average value of the computational thinking ability test of students in the control class reaches the value criteria, which is at least 75, and classical completeness reaches 80%.

The test was conducted using a one-sample t-test at a significance level of 0.05 and t_{table} of 2.032. The results show that the significance value of 0.269 more than the significance level and t_{value} of 1.123 is less than t_{table}, indicating that H_0 is accepted. This shows that the average computational thinking ability of students in the control class who received Direct Instruction learning is equal to 75 or lower than 75. Furthermore, in testing using a Binomial test at a significance level of 0.05. The result shows that the significance value of 0.311 is more than the significance level, so that H_0 is accepted. This shows that the classical completeness of the control class that received Direct Instruction learning did not reach 80%. Therefore, Direct Instruction learning is not effective in terms of students' computational thinking ability on the quadratic function material.

The application of Direct Instruction learning is not effective in terms of students' computational thinking skills on the quadratic function material because it focuses on delivering material directly. Learners receive more information passively and follow the steps directed by the teacher. As a result, students are not accustomed to sorting out relevant information from a problem. Learners tend to just follow the procedures taught by the teacher without understanding the concepts deeply so that they are less able to apply material concepts to solve new problems. Generally, students succeed in solving problems similar to examples that have been taught by the teacher before, but have difficulty finding solutions to problems with different contexts that require independent thinking. In addition, learning activities that do not fully involve learners hinder the development of the ability to analyze, recognize errors, and correct them.

3.5 Comparison of the Effectiveness of Contextual Teaching and Learning (CTL) with ICARE Model Assisted by GeoGebra and Direct Instruction Learning in Terms of Students' Computational Thinking Ability

Contextual Teaching and Learning (CTL) with the ICARE Model assisted by GeoGebra is more effective than Direct Instruction learning in terms of students' computational thinking ability on the quadratic function material. The criterion for the effectiveness of the third hypothesis is the average value of the computational thinking ability test of students in the experimental class is higher than the average value of the computational thinking ability test of students in the control class.

The test was conducted using a Independent Sample T-test at a significance level of 0.05 and t_{table} of 2.000. The results show that the significance value of 0.000 is less than the significance level and t_{value} of 4.666 is more than the t_{table}, indicating that H_0 is rejected. This shows that the average students' computational thinking ability in the experimental class is higher than the average value of students' computational thinking ability in the control class. Therefore, Contextual Teaching and Learning (CTL) learning with the ICARE model assisted by GeoGebra is more effective than Direct Instruction learning in terms of students' computational thinking ability on the quadratic function material.

Contextual Teaching and Learning (CTL) learning with the GeoGebra-assisted ICARE model emphasizes the connection of material to real contexts with structured learning activities, starting from the introduction, linking, building understanding, applying material to problems, reflecting on concepts, and strengthening understanding by solving new problems. This learning is supported by the use of GeoGebra, which facilitates the visualization and exploration of material concepts. Through this learning activity, students are actively involved during the learning process, which allows them to develop thinking skills in determining problem-solving strategies. Meanwhile, Direct Instruction learning focuses more on the direct delivery of material and giving examples by the teacher. Although the delivery of materials and directions are given clearly, the involvement of learners during the learning process tends to be limited, thus reducing the opportunity for learners to think independently and explore in their own way. Thus, the findings of this study indicate that Contextual Teaching and Learning (CTL) learning combined with the ICARE model and GeoGebra assistance is effective in terms of students' computational thinking skills.

4. Conclusion

Based on the results and discussion of the research, the following conclusions were obtained: (1) Contextual Teaching and Learning (CTL) learning with ICARE model assisted by GeoGebra is effective in terms of students' computational thinking ability with an average score of 84.36 and classical completeness of 85.29%; (2) Direct Instruction learning is not effective in terms of students' computational thinking ability with an average score of 76.23 and classical completeness of 60.00%; and (3) Contextual Teaching and Learning (CTL) learning with ICARE model assisted by GeoGebra is more effective than Direct Instruction learning in terms of students' computational thinking ability.

Contextual Teaching and Learning (CTL) learning with the ICARE model, assisted by GeoGebra, can be used as an alternative to improve students' computational thinking ability. This research can serve as a reference or guide for further research. Future research is suggested to involve classes with students who have equal levels of openness and confidence to minimize the influence of external factors on research results. In addition, it is recommended to apply other mathematics materials beyond the quadratic function so that the results of the study can be generalized and the consistency of its effectiveness across various learning contexts is established.

Declarations

Author Contribution	:	AC: Conceptualization, Writing - Original Draft, Visualization, and Investigation; NLA: Methodology, Editing, Formal analysis, Writing – Review, and Validation
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Conflict of Interest	:	The authors declare no conflict of interest.
Additional Information	:	-

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