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Students' ability of understanding concepts and computational skill based on learning styles in the discovery learning model

Rania Febri Hapsari[1], Yemi Kuswardi[1], Riki Andriatna[1*]

[1]Universitas Sebelas Maret, Surakarta, Indonesia
[*]Correspondence: andriatna.riki@staff.uns.ac.id

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Abstract
Students often face difficulties in both understanding mathematical concepts and performing computations, largely because current teaching methods have not fully supported the development of these skills. This study aims to determine the effect of discovery learning model on conceptual understanding and computational skills based on students' learning styles. This study used a quantitative study with a quasi-experimental design that employed a control group design with a posttest only. This study involved 62 students from a State Junior High School in Sukoharjo Regency, selected through cluster random sampling, with 31 in the experimental group experiencing discovery learning and 31 in the control group receiving direct instruction. Data collection used a test method to measure the ability to understand concepts and computational skills and a questionnaire to categorize students' learning styles. The data analysis technique used multivariate analysis of variance (MANOVA). The results showed that (1) conceptual understanding and computational skills who were given discovery learning was significantly better than students who were given direct learning; (2) there is no difference in conceptual understanding and computational skills of visual, auditory, and kinesthetic learning style students; (3) in visual, auditory, and kinesthetic learning styles, discovery learning produces better conceptual understanding and computational skills than direct learning; and (4) in discovery learning and direct learing, there is no difference in concept understanding and computational skills of visual, auditory, and kinesthetic learning style students. The results contribute by providing empirical evidence that discovery learning improves students' conceptual understanding and computational skills across different learning styles, providing valuable insights for teachers and curriculum developers in implementing more effective teaching strategies.

Keywords: computational skill; discovery learning; learning style; understanding concept

Introduction

Mathematics has a role for the development in science and technology. Mathematics teaches at all levels of education in Indonesia, from primary to secondary education. According to the 2013 curriculum, at the junior high school level, the core competencies that students must have are spiritual attitudes, social attitudes, knowledge, and skills. National Research Council (2001) and NCTM (2000) states that there are five important abilities that must be developed in learning mathematics at school, namely conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. Laswadi et al. (2016) emphasized that concept understanding ability is one of the important abilities in learning mathematics at school. In line with this, the mathematics learning curriculum has bridged the development of concept understanding skills. This is stated in Permendiknas Number 23 of 2006 which states that the ability to understand concepts is one of the standards of mathematics graduation.

Understanding something is the process of assimilating something into a scheme (Skemp, 1987). Harel and Sowder stated that understanding ability is a mathematical ability that leads to: (1) certain interpretations or meanings of concepts, relationships between concepts, statements, or problems; (2) certain solutions offered by individuals to a problem; and (3) certain evidence offered by individuals to build or reject mathematical statements (Nisa et al., 2021). Gray and Tall stated that concepts refer to a set of properties that act as concept definitions to build axiomatic systems in advanced mathematical thinking (Nisa et al., 2021). Concepts are abstract ideas that allow a person to be able to group objects or events and explain whether the object or event is an example or not an example of the idea (Fajar et al., 2018). Thus, mathematical concepts are a set of abstract ideas or properties in mathematics that build knowledge in mathematics.

National Research Council (2001) states that conceptual understanding ability is an ability that refers to understanding mathematical concepts to perform mathematical operations and connect various concepts. Laswadi et al. (2016) stated that concept understanding ability is a mathematical ability that helps students to organize their knowledge. Another definition states that concept understanding ability describes the connectedness of mathematical ideas (Kharatmal, 2009), so that students who have good concept ability can explain, describe, and apply several concepts in different situations (Malatjie & Machaba, 2019). Nisa et al. (2021) stated that concept understanding ability is built on internal relationships with pre-existing ideas so that it is needed when identifying and applying principles, facts, and definitions as well as comparing and contrasting concepts. Concept understanding ability one of the most important abilities, especially in developing problem solving skills (Geary, 2004). Through concept understanding ability, students can process information effectively when solving a problem. Thus, the ability to understand mathematical concepts is the ability of students to understand factual knowledge and interpret abstract ideas correctly from a group of objects or events in the domain of mathematics.
National Research Council (2001) states that there are several abilities if a student has good concept understanding skills, namely being able to use knowledge of mathematical concepts to explain new things. This will help students expand their knowledge. In addition, according to the

National Research Council (2001), students with good concept understanding skills can choose and use several representations well and communicate their ideas effectively and efficiently. Laswadi et al. (2016) stated that someone who has good concept understanding ability is if they are able to connect mathematical concepts with one another, represent mathematical situations into various contexts, and know the relevant representation for a particular situation. In line with the two opinions above, NYED states that indicators of concept understanding ability are being able to identify and apply principles, know and apply facts and definitions, and compare and contrast interrelated concepts (Nisa et al., 2021). By referring to some of the opinions above, the indicators of concept understanding ability are the ability to restate concepts, classify objects, mention examples or non-examples, and apply concepts logically.

Besides the ability to understand concepts, learning mathematics requires computational skills. Prince stated that there are two kinds of mathematics learning outcomes that must be mastered by students, namely concept understanding and computational skills (Ardiyanto et al., 2016). Millians (2011) stated that computational skills are the selection and application of arithmetic operations to calculate the solution of mathematical problems. Computational skills are an ability to apply some mathematical concepts including addition, subtraction, multiplication, and division, as a basis for learning other sciences in a short time in the right way and results through practicing activities (Ardiyanto et al., 2016). Thus, mathematical computational skills are the ability of students to solve mathematical problems in numerical form (number operations) which are characterized by the ability to determine and use appropriate calculation techniques and perform calculations correctly to find solutions to these mathematical problems. From this understanding, the indicators of computational skills can be described, which include determining/using appropriate calculation techniques and performing calculations correctly.

Given the importance of concept understanding and computational skills, students should have both. But in reality, student learning outcomes in concept understanding and mathematical computational skills are still fairly low. Fajar et al. (2018) showed that students' concept understanding ability was still low with a low category of 87% of students. This is because students do not know efficient and effective ways of learning because they only try to memorize formulas (Fajar et al., 2018). Likewise, the results of Umam and Zulkarnaen (2022) show that students' mathematical concept understanding abilities are still categorized as low, with an average percentage of mathematical concept understanding abilities obtained of 35.90%. Umam and Zulkarnaen (2022) stated that the low concept understanding ability of students was due to the lack of student concentration, irregular learning habits and the learning methods used were less interesting. The condition of low student achievement in concept understanding ability also occurs in computational skills (Kamil et al., 2021; Rahmadhani & Mariani, 2021). This can be seen from the acquisition of student achievement in the aspect of student computational skills which shows that student computational skills in the low category are 24% and very low with 24%. This is because students are only given routine problems during learning (Kamil et al., 2021). These problems are certainly far from the expected conditions of mathematics learning.

There are external and internal factors that can influence students' concept understanding ability and computational skills. One of the external factors of students that can have a positive influence on the ability to understand concepts and computational skills is the learning model. Setiawan et al. (2019) stated that there are several learning models that can positively influence students' concept understanding and computational skills, one of which is the discovery learning model.

Irawan et al. (2019) stated that discovery learning is a learning model with discovery which in its application emphasizes the importance of understanding the structure or important ideas of a science through active involvement of students in the learning process. In the discovery learning model, students are asked to actively find their own concepts used to solve problems (Moore, 2009; Rahmiati et al., 2017). Thus, the discovery learning model is learning that focuses on students actively acquiring and discovering new knowledge by utilizing existing knowledge.

In its implementation, the discovery learning model consists of several stages. Moore (2009) states that the stages of the discovery learning model include: (1) problem identification; (2) developing possible solutions; (3) data collection; (4) data analysis and interpretation; and (5) testing conclusions. In line with Moore, (Kemendikbud, 2017) and Djamarah (Inde et al., 2020) state that the discovery learning model consists of six stages which include: (1) stimulation; (2) problem statement; (3) data collection; (4) data processing; (5) verification; and (6) generalization. The stimulation stage aims to develop students' curiosity in the knowledge they will learn in class. Furthermore, at the problem statement stage, students are expected to have an awareness of the problems they face and can formulate the problem appropriately. After students state a problem statement, then students enter the data collection stage, where students collect data to solve the problem that has been formulated. At the data processing stage, students analyze the data they have collected. The data that has been collected is then verified (verification) where students compare the results of their data analysis with the findings of other groups, books, or their teachers. The last stage is generalization, students are expected to be able to conclude the solution to the problem formulated earlier (Kharismawati et al., 2020). By paying attention to these stages, students construct an understanding of the mathematical concepts being studied.

In addition to the learning model, there are internal student factors that are thought to have an influence on the ability to understand concepts and computational skills. One of them is students' learning style (Nurlia et al., 2021). During face-to-face and distance learning, students are required to learn independently so that students need to find a learning style that suits them. Hamdani et al. (2022) stated that learning style is the way students choose to absorb, organize and process information. De Proter and Hernacki state that learning style is a combination of various ways/situations in which a person learns and absorbs information or knowledge (Sirait, 2017). Of the many learning styles, the simplest learning style is Visual- Auditory-Kinesthetic (VAK). Sirait (2017) states that visual learning style is a learning style that uses more of the sense of sight such as seeing, observing, reading, and illustrating information / knowledge to be more easily accepted. Auditory learning style is a learning style that uses more auditory senses such as listening and receiving sound stimuli to make it easier to understand information/knowledge, while kinesthetic learning style uses more body movements such as practicing the knowledge received (Sirait, 2017). Therefore, this research aims to see the effect of discover learning model on students' conceptual understanding ability and computational skills in terms of students' learning style. Furthermore, this study contributes empirical evidence in the form of an alternative innovative learning model to improve students' concept understanding ability and computational skills.

Methods

This research is a quantitative study with a quasi-experimentation design with a posttest control only group design. The population in this study were all eight-grade students at one of the State Junior High School in Sukoharjo Regency in Central Java, Indonesia. The sample was taken using cluster random sampling due to practicality and efficiency considerations, without having to divide students into new groups, thereby maintaining classroom dynamics. In addition, this technique ensures that the sample is representative of the population. This study involved 62 students, with 31 in the experimental group experiencing discovery learning and 31 in the control group receiving direct instruction.

Data collection methods use test methods and non-test methods. The test method used a test instrument in the form of math questions on the topic of Cube and Cuboid for concept understanding ability and computational skills given at the end of the study. The indicators of concept understanding ability on the test instrument include the ability to restate concepts, classify objects, mention examples or non-examples, and apply concepts logically, while the indicators of computational skills include the skills to determine or use appropriate calculation techniques and perform calculations correctly. The instruments used have been tested in advance for the purpose of obtaining validity which is in detail presented in Table 1 below, where the elements of construct validity have been met based on the results of the analysis of experts/validators who have been appointed.

Table 1. Recapitulation of test instrument validation results.

Aspects	Items Number	Dicriminating Index	Difficulty Index	Reliability	Description
Ability of Understanding Concept	1	0.699	0.618	0.704	All items test used
	2	0.561	0.877		
	3	0.849	0.761		
	4	0.786	0.298		
Computational Skill	5	0.377	0.869	0.701	All items test used
	6	0.798	0.660		
	7	0.835	0.400		
	8	0.798	0.182		

The non-test instrument used a questionnaire with a Likert scale to determine the students' learning style groups (audio, visual, and kinesthetic learning styles) given at the beginning of the study. Indicators of each learning style are presented in Table 2 below. Students' learning styles were then determined based on the opinion of Wiedarti (2018) through the highest number of scores among the questionnaire results of the three learning styles.

Table 2. Indicators of learning styles

Visual	Auditory	Kinesthetic
Neat and structured	Learn using the sense of hearing	Learning with independent practice/activity
Learn using the sense of sight	Sensitive to sound	Use a lot of movement/gestures
Sensitive to colors and images	Often talks to themselves	Can't sit still for long periods of time
Difficult to engage in verbal dialog/activity	Difficult in visual activites	Difficult to remember visual and verbal activities

The independent variables in the study were learning model and learning style, while the dependent variables in this study were the ability to understand mathematical concepts and computational skills. The learning models studied were discovery learning model and direct learning model. Learning styles in this study were grouped into three, namely visual, auditory, and kinesthetic learning styles. The data analysis technique used Two-Way Multivariate Analysis of Variance (MANOVA). MANOVA testing was performed after fulfilling the assumptions of normality and homogeneity for the learning model and learning style factors. All tests were performed at a 5% significance level with data processing using SPSS.

Results and Discussion

This research involved two group, namely experimental group with discovery learning model and control group with direct learning model. The learning process in the experimental group using discovery learning was carried out through stages that emphasized student involvement in finding concepts, rather than simply receiving information from the teacher. In practice, learning was carried out using student worksheets that allowed students to carry out guided discovery activities. In the worksheet provided, students construct their understanding of the concepts learned through the problems given. One of the activities carried out is shown in Figure 1. Through problems presented by the teacher, students search for information to answer the problems given. Next, the information obtained is analyzed and related to mathematical problems and concepts. In this process, students are encouraged to understand the relationships between concepts so that they can develop conceptual understanding. At the verification stage, students must check the results obtained, including through discussions with peers and teachers. At this stage, not only logical thinking is involved, but also computational skills.

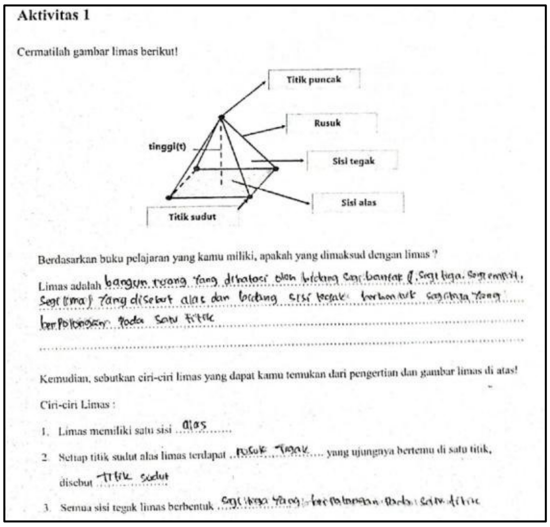

Figure 1. Student activity in worksheets for constructing conceptual understanding

Activities in the learning process that support computational skills focus on verificationactivities. In these activities, students are presented with problems involving mathematical calculations as part of the application of previously constructed mathematical concepts (see Figure 2). In Figure 2, the activity focuses on the application of mathematical concepts in the form of arithmetic operations in relation to calculating the surface area of a square pyramid. In addition to assessing students' understanding of the concept of surface area, this activity also emphasizes the accuracy of the calculations performed by students. Thus, students not only understand the concept, but also correctly perform the calculations for the problems given.

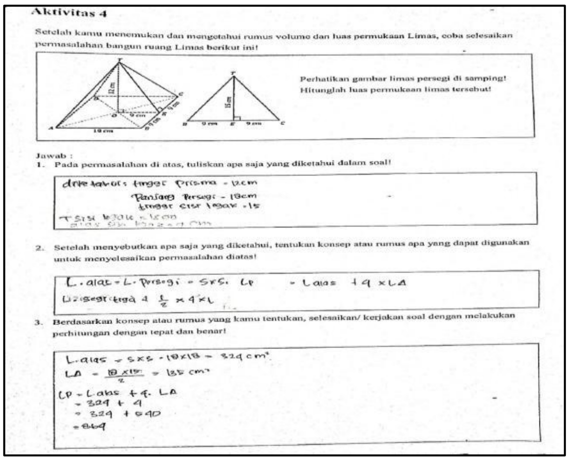

Figure 2. Student activity in worksheets for enhancing computational skills

The data in the form of concept understanding ability test data and students' computational skills after students get learning according to the specified learning model are tested using multivariate analysis of variance (MANOVA). Before the multivariate analysis of variance test, the prerequisite test was first conducted, namely the normality and homogeneity test of each sample group with the results as presented in Table 3 and Table 4.

Table 3. Normality test results

Sources		χ^2_{obs}	Percentage of Value $d_j^2 \leq \chi^2_{0.05;2}$	Conclusion
Learning Model	Discovery Learning	5.990	90.320	Normal
	Direct Learning	5.990	96.770	Normal
Learning Style	Visual	5.990	96.770	Normal
	Auditory	5.990	100	Normal
	Kinesthetic	5.990	100	Normal

Table 4. Homogenity test results

Sources		χ^2_{obs}	χ^2_{table}	Conclusion
Learning Model	Discovery Learning Direct Learning	0.540	7.820	Homogen
Learning Style	Visual Auditory Kinesthetic	0.540	12.590	homogen

Based on the results in Table 3, the normality test shows that in each source, namely the learning model and learning style, the samples was normally distributed population. Likewise, the results of the multivariate homogeneity test in Table 4 show that each population of samples from experimental and control classes in the learning model and learning style groups has a homogeneous variance.

The results of the calculation of intercellular averages of students' concept understanding and computational skills in the learning model and learning style groups are presented in Table 5 and Table 6 below.

Table 5. Marginal mean of ability of understanding concept

Learning Models	Mean			Marginal Mean
	Visual	Auditory	Kinesthetic	
Discovery Learning	76.500	80.800	73.250	76.350
Direct Learing	57.240	62.000	60.140	58.970
Marginal Mean	67.140	69.830	67.130	

Table 6. Marginal mean of ability of computational skill

Learning Models	Mean			Marginal Mean
	Visual	Auditory	Kinesthetic	
Discovery Learning	68.390	71.000	52.250	64.650
Direct Learning	53.290	50.140	47.710	51.320
Marginal Mean	61.060	58.830	50.130	

Table 5 and Table 6 show that the marginal means of concept understanding and computational skills. Table 5 shows the mean value of concept understanding based on model and learning style. Based on the model, the average value of concept understanding ability of students who get learning with discovery learning was higher than the direct model, while on the learning style review, the average concept understanding ability of students with auditory learning style is higher than students who have visual and kinesthetic learning styles. Table 6 shows the mean value of computational skills based on the model and learning style. Based on the model, the average value of computational skills of students who received learning with discovery learning model is higher than the direct model. Meanwhile, based on learning styles, students with visual learning styles have higher mean values than students with auditory and kinesthetic learning styles.

Furthermore, to see whether there is a significant difference or influence, Two-Way MANOVA test was conducted with the following results.

Table 7. Summary of two-way MANOVA

Sources	F_{obs}	F_{table}	Result
Learning Model	13.770	3.400	Rejected H_0
Learning Style	1.530	2.740	Rejected H_0
Interaction	0.480	2.740	Rejected H_0

Based on Table 7, the learning model factor shows that there is a significant effect of learning model on students' concept understanding and computational skills. The learning style factor shows that there is no effect of learning style on students' concept understanding and computational skills, while the interaction factor shows there is no interaction between learning model and learning style on students' concept understanding and computational skills.

The significant effect of the learning model on students' concept understanding and computational skills shows that there is a difference in the average ability of concept understanding and skills between students who get learning with discovery learning model and direct learning model. With a significant difference based on the results of the manova test, further tests were carried out using the univariate two-way analysis of variance (ANOVA) test on each ability, i.e for ability of understanding concepts and computational skill.

Table 8. Summary of two-way ANOVA for ability of understanding concept

Sources	F_{obs}	F_{table}	Result
Learning Model	26.760	4.000	Rejected H_0
Learning Style	0.870	3.150	Accepted H_0
Interaction	0.360	3.150	Accepted H_0

The results of the anova test in Table 8 show on the learning model factor, there is a significant effect of the learning model on students' concept understanding. Meanwhile, the learning style factor shows that there is no effect of learning style on students' concept understanding. In line with the learning style factor, the interaction factor shows there is no interaction between the learning model and learning style on students' concept understanding.

Based on the anova test results in Table 8 above, it is known that the learning model factor has a significant influence on concept understanding. Because there is a significant difference, then based on the marginal mean value in Table 5, it is obtained that the average value of the ability to understand the concept of students who get learning with the discovery learning model is greater than the average value of the ability to understand students who get learning with the direct model. This shows that the effect of discovery learning model is better than direct learning model. These results are relevant to several studies (Hendrik & Minarni, 2017; Setiawan et al., 2019) which state that the discovery learning model produces better understanding of mathematical concepts than the direct learning model. This is because the discovery learning model is one of the discoveries learning models where students construct their own knowledge and concepts so that learning is more meaningful with the ability and relevance of the information they have (In'am & Hajar, 2017). In line with In'am and Hajar's opinion, Ahmad (2015) stated that learning through discovery provides opportunities for students to further develop the understanding obtained through the construction process so that learning becomes more meaningful. Furthermore, Ahmad (2015) explained that with this opportunity, learning becomes more meaningful so that students' understanding of concepts increases.

The ANOVA results for learning styles on concept understanding ability showed acceptance of the null hypothesis, so that learning styles did not have a significant effect on concept understanding ability. This means that the concept understanding ability between students with auditory, kinesthetic, and visual learning styles has a concept understanding ability that is not significantly different. This is in line with the results of research conducted by Ulum and Pujiastuti (2020) which states that learning style does not have a significant effect. Likewise, the interaction shows acceptance of the null hypothesis, so it is concluded that there is no interaction between learning models and learning styles on concept understanding ability. The following presents the interaction profile between learning models and learning styles on concept understanding ability.

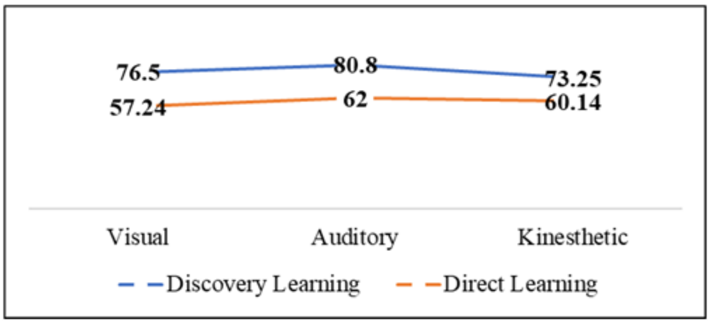

Figure 3. Interaction profile of learning model and learning style on ability of concept understanding

Based on the ANOVA results for the interaction factor, it is concluded that there is no interaction between learning models and learning styles on concept understanding ability. This means that the characteristics of differences in concept understanding ability that occur for each review are the same. Because there is no interaction, the multiple comparison test between cells is not conducted, but the marginal mean and average value between cells can be seen as in Table 5 and Figure 3. In Figure 3, it can be seen that in each learning style and learning model shows a situation that is not different (consistent). The interaction profile between learning model and learning style shows the same pattern. In each of the visual, auditory, and kinesthetic learning styles, it shows that the average value of concept understanding ability of students who get learning with discovery learning model is higher than students who get learning with direct model. Thus, discovery learning is better than direct learning, both in general and in each learning style. Meanwhile, when viewed in each learning model, the average value of students' concept understanding ability between students with visual, auditory, and kinesthetic learning styles has a difference that is not too far away, so that the ability to understand concepts in each learning style is not different, both in general and in each learning model.

Furthermore, in the aspect of computational skills, the results of two-way ANOVA presented in Table 9 below.

Table 9. Summary of two-way ANOVA for ability of computational skill.

Sources	F_{obs}	F_{table}	Result
Learning Model	7.610	4.000	Rejected H_0
Learning Style	2.140	3.150	Accepted H_0
Interaction	0.960	3.150	Accepted H_0

In Table 9, the anova test results show that, in the learning model, there is a significant effect of learning model on students' computational skills. While the learning style factor and the interaction between learning model and learning style on computational skills show acceptance of the null hypothesis. This means that learning style does not give significant influence on computational skills and no interaction between learning model and learning style on students' computational skills.

In the aspect of computational skills, it shows that the learning model has a significant effect. Referring to Table 6, the marginal mean value of students who received the discovery learning model is greater than the direct learning model. This shows that the effect of discovery learning model on computational skills is better than direct learning model. These results are relevant to Setiawan et al. (2019) who stated that the discovery learning model produces better mathematical computational skills than the direct learning model. The better effect of the discovery learning model on communication skills is because in learning with the discovery learning model, students are given ample opportunities to conduct discussions in groups, including in the computation process. The learning process that involves students in group discussion activities can improve computational skills. In addition, the Ministry of Education and Culture stated that by learning through discovery learning, students' cognitive skills, including computational skills, will be improved and enhanced due to the growing desire in the investigation process.

On the learning style factor, the two-way ANOVA results showed that learning style did not have a significant effect on computational skills. This means that students with visual, auditory, and kinesthetic learning styles have computational skills that are not significantly different. These results are relevant to the research of Budiarti and Jabar (2016) who stated that there is no significant effect of visual, auditory, and kinesthetic learning styles on mathematics learning outcomes, one of which is computational skills. Computational skills do not depend on one's learning style, but on conceptual knowledge, procedural knowledge, and declarative knowledge that involves deep understanding (Miller et al., 2011). In addition, according to Fuchs et al. (2008) that improving computational skills will depend on prior work and working memory and processing skills.

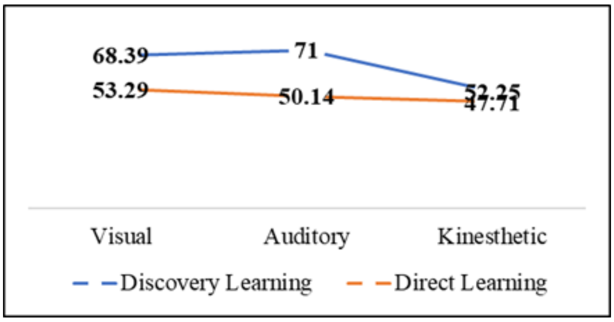

Figure 4. Interaction profile of learning model and learning style on computational skill

The results of two-way ANOVA related to interaction showed no interaction between learning model and learning style on computational skills. This means that the characteristics of differences in computational skills that occur for each review are the same. Because there is no interaction, the multiple comparison test between cells is not conducted, but it is seen from the comparison of the marginal and mean values between cells. Figure 4 shows that there is no interaction, i.e., the pattern on the profile shows the same thing. Based on Figure 4, it is found that in each learning style, the average value of computational skills of students who get learning through discovery learning model is greater than students who get direct learning model. Thus, the discovery learning model is better than direct learning on computational skills, both in general and in each learning style. Meanwhile, when seen in each learning model, the average value of computational skills of students with visual, auditory, and kinesthetic learning styles does not show a big difference. This means that the computational skills of students with visual, auditory, and kinesthetic learning styles are not different, either in general or in each learning model.

The study conducted addresses gaps in the literature related to improving conceptual understanding and computational skills, particularly at the junior high school level. Factors that influence conceptual understanding and computational skills do not only come from pedagogical factors, but also from internal factors within students, such as learning styles. With the results obtained, this study contributes direct evidence that the discovery learning model has a positive contribution to improving students' conceptual understanding and computational skills. This shows that the discovery learning model can be one of the alternative learning models that can be used in the future to improve both abilities. In addition, in the research conducted, learning style factors were a characteristic of this study. However, the learning style characteristics involved showed no significant influence, which could be a subject for future study to explore more deeply the role of learning styles in conceptual understanding and computational skills.

Conclusion

Based on the results of data analysis, it can be concluded that the learning model has a significant effect on concept understanding and mathematical computational skills, where the discovery learning model has a better effect than the direct learning model. However, learning style does not have a significant effect on concept understanding and mathematical computational skills. In each learning style (visual, auditory, and kinesthetic), students who received learning through discovery learning model had better concept understanding and mathematical computational skills than direct learning model. However, in each learning model, both the discovery learning model and the direct learning model, there was no difference in concept understanding and mathematical computational skills between students with visual, auditory, and kinesthetic learning styles. By referring to the results obtained, the discovery learning model can be used as an alternative learning model that can be used in mathematics learning to improve the ability to understand concepts and computational skills.

The study was limited to examining the effect of the discovery learning model on conceptual understanding and computational skills. However, it did not fully explore in depth how students develop conceptual understanding and computational skills. This presents a suggestion for further research to qualitatively investigate the process of students' conceptual understanding and computational skills, thereby complementing the quantitative findings obtained.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been covered completely by the authors.

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