

Independent Learning and Student Learning Responsibilities Characteristics of Mathematics Knowledge Competence in Fifth-Grade Elementary School

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ABSTRAK

Kebiasaan peserta didik menunda-nunda tugas yang diberikan guru menjadi salah satu kebiasaan yang perlu dihilangkan. Hal itu terjadi karena kurangnya percaya diri peserta didik dengan kemampuannya. Penelitian ini bertujuan untuk membuktikan pengaruh kemandirian belajar dan karakter tanggung jawab belajar siswa terhadap kompetensi pengetahuan matematika siswa kelas V SD. Jenis penelitian ini adalah ex-post facto dengan desain penelitian Korelasional. Populasi yang digunakan dalam penelitian ini berjumlah 116 siswa. Pengambilan sampel berdasarkan populasi yang ada menggunakan teknik proporsional random sampling, sehingga diperoleh jumlah sampel yakni sebanyak 92 orang. Proses pengumpulan data dilakukan dengan menggunakan instrumen kuisisioner dan metode pencatatan dokumen. Analisis statistika yang digunakan adalah analisis regresi sederhana dan analisis regresi ganda. Hasil dari analisis regresi linier sederhana untuk pengujian hipotesis I dan II diperoleh hasil terdapat pengaruh yang signifikan kemandirian belajar terhadap kompetensi pengetahuan matematika dan terdapat pengaruh yang signifikan karakter tanggung jawab belajar terhadap kompetensi pengetahuan matematika. Hasil analisis regresi linier ganda diperoleh terdapat pengaruh yang signifikan kemandirian belajar dan karakter tanggung jawab belajar siswa terhadap kompetensi pengetahuan matematika siswa kelas V SD. Disimpulkan terdapat pengaruh yang signifikan kemandirian belajar dan karakter tanggung jawab belajar siswa terhadap kompetensi pengetahuan matematika siswa kelas V SD.

ABSTRACT

The habit of students procrastinating on assignments given by the teacher is one of the habits that need to be eliminated. It happened because of the need for more confidence in students in their abilities. This study aims to analyze the influence of independent learning and the character of students' learning responsibility on the competence of mathematics knowledge of fifth-grade elementary school students. This type of research is ex-post facto with a correlational research design. The population used in this study amounted to 116 students. Sampling is based on the existing population using a proportional random sampling technique to obtain a total sample of 92 people. The data was collected using a questionnaire instrument and document recording methods. The statistical analysis used is simple regression analysis and multiple regression analysis. The simple linear regression analysis results for testing hypotheses I and II show a significant effect of learning independence on the competency of mathematical knowledge and a significant effect of the character of learning responsibility on the competence of mathematical knowledge. The multiple linear regression analysis results showed a significant effect of learning independence and the character of student learning responsibility on the competence of mathematics knowledge of fifth-grade students in elementary school. It was concluded that there was a significant influence of learning independence and the character of students' learning responsibility on the competence of mathematics knowledge of fifth-grade elementary school students.

1. INTRODUCTION

Basic education is the most important education because, in basic education, children will be taught to form their personalities. Education plays a very important role for a person and his nation. Education plays a core role in forming a quality generation. The better the education received, the higher the quality of the generation produced (Sembiring et al., 2022; Ina Ledun et al., 2020; Junaidi & Kun Prasetyo, 2016). In its implementation, education in elementary schools is given to students with a number of materials and subjects that they must master, and can achieve the competencies or abilities possessed by a person in carrying out a job or task in a particular field in the form of skills, knowledge, basic attitudes and The value contained in a person is reflected in the ability to think and act consistently. In an era like today, students need to be equipped with critical thinking skills so they can consider everything carefully. One lesson that can train students' ability to think critically is mathematics. Mathematics is a very important subject and needs to be taught to equip students with logical, analytical, systematic, critical, and creative thinking skills (Jafar et al., 2022; Ridwan, 2021; Ulichusna et al., 2019). Mathematics is one of the learning content taught to students from elementary, middle, high school, and college levels. Learning mathematics at the elementary school level has a very important goal: to train students' critical, creative, and careful thinking patterns and be able to solve various problems that exist in everyday life (Arifin, 2018; Hakim et al., 2022; Sofyan & Ratumanan, 2019). A student can be said to have achieved this goal if the student is able to fulfill the mathematical knowledge competencies set at each level of education. In learning mathematics, students will be accustomed to being taught to gain an understanding through experience about the properties that a collection of objects has and does not have (abstraction) (Djabba et al., 2022; Nurriskah et al., 2020; Simanullang, 2020). In the process of achieving mastery of students' mathematical knowledge competencies at school, various factors can be influenced. These factors can come from within the student himself (internal factors) and can also come from outside the student (external factors). Examples of internal factors that can influence students' achievement of mastering mathematical knowledge competencies at school are learning independence, responsible attitudes, and learning discipline in participating in learning activities. Meanwhile, the school environment where students study, the quality of information from children and parents, the mother's employment status, and the parenting style applied by students at home are examples of external factors that can influence students' achievement of mathematical knowledge competencies.

Based on observations at SDN 3 Bongkasa, which is one of the elementary schools in Gugus III Abiansema, it was found that the teacher gave several students assignments. However, these students did not do the assignments given by the teacher well, always procrastinating in doing the assignments so that they often time tight, still unsure about their abilities, asked the teacher to be directed continuously in learning activities, needed excessive support from other people in solving their problems, are unable to learn independently, students carry out activities at the behest of others, students often copying a friend's work when there is an assignment. Responsibility in learning is the obligation to complete tasks that have been fully accepted through maximum effort and courage to bear all the consequences. Responsible students are students who can fulfill their duties and needs and are able to fulfill their responsibilities towards the surrounding environment well. It indicates that some students at SDN 3 Bongkasa have less responsibility for learning. Students' awareness of carrying out their duties and obligations still needs to be improved. Students do not carry out the teacher's instructions as well as possible during learning. One example is if a teacher at school gives a student homework, he must do the homework as well as possible without any feeling of compulsion within him because a student should carry out his duties at school. It will also affect the mathematical knowledge competency of each student. Apart from that, student learning independence is also very important for every individual to have. However, when conducting direct observations at SDN 3 Bongkasa, it was found that several students needed more learning independence. It could be seen from the students who were given assignments by the teacher to do but did not do them but waited for their friends to do them. Apart from that, during general exams, students still copied their results, which his colleague repeated. It is an example of how important it is for students to be given or nurtured in their character, one of which is the character of responsibility. The character of responsibility can be interpreted as the character of someone loyal to the actions they have done so that they are not in accordance with their obligations to complete the actions they have done (Jais & Fahnur, 2021; Nurmalsary, 2018; Taufik & Harjanty, 2021). This character can indicate whether a person is mature or not in facing each of his obligations, regardless of the problems faced in carrying them out. The low level of student responsibility can have an impact on the learning outcomes obtained because students are less aware of the duties and obligations they should carry out as students studying. Apart from that, another factor that can influence Mathematics Knowledge Competency is learning independence. Mathematics cannot be separated from a student's independent learning in independently carrying out a mathematics learning process (Hendrianti et al., 2021; Oktavera, 2015). In fact, someone who does not have

independent learning will definitely not be able to stand alone and will not develop self-confidence in life in the world of education. Independent learning is very important and must be a concern for parties involved in the world of education. Students who are used to being independent in learning when faced with a problem will tend to be calm when carrying out learning assignments because they have high self-confidence, so other people's opinions do not easily influence them. Solutions exist because of a problem. Therefore, when we are faced with a problem, it is hoped that we can try to find a solution and remain consistent. The level of student responsibility can have an impact on the learning outcomes obtained because students are less aware of the duties and obligations they should carry out as students studying. Learning independence has a positive influence on students' mathematics learning outcomes, although the percentage is still below 50% (Aliyah et al., 2019; Restu, 2020). It may be influenced by students' lack of knowledge about independent learning, so it has yet to be implemented optimally. Therefore, to improve student learning outcomes, it is necessary to increase student learning independence.

Learning independence influences learning activities carried out by individuals with freedom without depending on the help of others as an increase in knowledge, skills, or achievement development, which includes determining and managing their teaching materials, time, and place and utilizing various learning resources as needed. There is a positive relationship between learning responsibility and learning outcomes in Buddhist education subjects through controlling learning independence (Sobri et al., 2020; Wahid et al., 2022). This means that learning responsibility is one of the variables that correlates with learning outcomes. Based on these problems, the author will conduct research with a wider scope and take data from many schools, using clusters that cover several schools, just as the research carried out by this author will be carried out in elementary schools. Apart from that, this research was conducted because there are differences in the character of independent learning and the character of responsible learning in elementary and high school children. It can be seen from the character of elementary school children who tend to like to play, move around, work together in a group, and carry out various practical practices directly from every theory that has been studied previously. Meanwhile, the character of high school students is becoming more and more formed, and they are starting to be able to take responsibility for what they have done and make decisions about their future journey in life. So, this research aims to analyze the influence of learning independence and the character of students' learning responsibility on the mathematics knowledge competency of fifth-grade elementary school students.

2. METHOD

This research uses a correlation research design (ex-post facto). Ex-post facto research is research conducted by researchers to research events that have occurred and then look back to find out the factors that could have caused the event. Learning independence and learning responsibility character are the independent variables in this research, while fifth-grade elementary school mathematics knowledge competence is the dependent variable. So, the relationship between these three variables is depicted in the following chart. This research was carried out on fifth-grade students at SD Gugus III Abiansemal, Abiansemal sub-district, Badung Regency. The research population is a generalized area consisting of subjects or objects that have certain qualities and characteristics determined by a researcher to be studied and then conclusions drawn (Sugiyono, 2019). The population in this study were all fifth-grade students at SDN Gugus III Abiansemal, with the number of students shown in Table 1.

Table 1. Composition of the Population of Fifth-Grade Students at SDN Gugus III Abiansemal

No	School name	Grade	The number of students
1	SD Negeri 1 Bongkasa	V	21 students
2	SD Negeri 2 Bongkasa	V	20 students
3	SD Negeri 3 Bongkasa	V	18 students
4	SD Negeri 4 Bongkasa	V	14 students
5	SD Negeri 1 Bongkasa Pertiwi	V	16 students
6	SD Negeri 2 Bongkasa Pertiwi	V	27 students
Total			116 orang

Data collection in research can be collected through non-test methods. The non-test method is a method that collects data by assessing the level of creative thinking abilities, including attitudes, behavior, and recording documents required for research. The data collection instruments used in this research were questionnaires and document recording. Data collection activities were carried out on sample students in the fifth grade of SDN Gugus III Abiansemal for the 2022/2023 academic year. In this research, data collection regarding students' learning independence and responsible learning characteristics was

collected using a non-test method by administering questionnaires. Meanwhile, data on students' mathematical knowledge competency was obtained by recording students' report cards for Semester 1. The questionnaire used as a data collection instrument is a structured questionnaire with a closed-answer form. Alternative answers are arranged based on a Likert scale with a score range of 1-4. Students can answer the questionnaire by ticking (√) in the answer choice column provided. There are two types of statements in the questionnaire: favorable and unfavorable statements. With the favorable and unfavorable statements presented, not all of them are positive (supportive), and not all of them are negative (not supportive) as if the contents of the scale favor or do not support the learning independence variable at all. The preparation of research instruments for learning independence variables is adjusted based on the grid and indicators related to the variables to be measured. The instrument grid was created to be able to map the question numbers that contain indicators of the variables measured in this research. The following is a grid for the learning independence questionnaire shown in Table 2.

Table 2. Learning Independence Questionnaire Grid

No	Indicators of Learning Independence	Number of Statement Items		total
		Favorable	Unfavorable	
1.	Learning Initiative and Learning Motivation	1,2,3	4,5	5
2.	Diagnose his learning needs	6,7,8	9,10	5
3.	Setting learning goals	11,12,13	14,15	5
4.	Organize and control learning performance	16,17,18	19,20	5
5.	Viewing learning difficulties as a challenge	21,22,23	24,25	5
6.	Search for and utilize relevant learning resources	26,27,28	29,30	5
7.	Select and apply learning strategies	31,32,33	34,35	5
8.	Evaluate the process of learning outcomes	36,37,38	39,40	5
9.	Self-concept (Self Efficacy)	41,42,43	44,45	5
TOTAL		27	18	45

The instruments used to measure the variables in this research are arranged based on a grid that has been adapted to the indicators to be measured. The grid that maps the question numbers containing indicators of the variables being measured is shown in Table 3.

Table 3. Character Questionnaire Grid for Learning Responsibility

No	Character Indicators of Learning Responsibility	Question number		total
		Favorable	Unfavorable	
1.	Do the assignments and homework given by the teacher well	1,3,5,7	2,4,6	7
2.	Responsible for every action taken	8,10,12	9,11,13,15	7
3.	Complete tasks according to previously established schedules	14,16,18,20	17,19,21	7
4.	Doing group assignments together.	23,25,27	22,24,26,28	7
Total		14	14	28

In the questionnaire that will be used, the author will carry out several tests. These tests are carried out in order for the author to obtain a theoretical picture regarding the quality of the instrument that will be used. There are also tests used in testing this questionnaire consisting of theoretical validation tests, empirical validity tests, and reliability tests. The data analysis method used is the inferential statistical analysis method. Meanwhile, the analysis techniques used in this research are descriptive statistical analysis techniques and inferential statistics. Descriptive statistical analysis is used in processing data, which is done by describing the data that the author has collected. Inferential statistical analysis techniques are used to test the hypothesis of a study.

3. RESULT AND DISCUSSION

Result

Data regarding the mathematics knowledge competency of fifth-grade students at SDN Gugus III Abiansemal was obtained through the grade five odd semester students' report cards, especially in the

student knowledge competency section (K13). The number of samples used in this research was 92 students. A description of the data is seen in [Table 4](#).

Table 4. Description of Mathematical Knowledge Competency Data

Statistic analysis	Mathematical Knowledge Competency
Sample	92
Maximum Score	91
Minimum Score	70
Mean	82,15
Standard Deviation	4,20
Variance	17,65

[Table 4](#) data regarding the competence of mathematics knowledge of fifth-grade students at SDN Gugus III Abiansemal is good. It is because the average student score is 82.15, which is between 80-89. Data regarding the learning independence of fifth-grade students at SDN Gugus III Abiansemal was obtained through distributing questionnaires. The sample used in this research was 92 students. A description of the data can be seen in [Table 5](#).

Table 5. Description of Learning Independence Data

Statistic analysis	Learning Independence
Sample	92
Maximum Score	120
Minimum Score	59
Mean	93,74
Standard Deviation	13,10
Variance	171,56

From [Table 5](#) regarding the student learning independence score categories, as well as the results of data analysis, it is known that the average (mean) of student learning independence is 93.74, and the average is in the score category 82.5 to 97.5. So, it can be concluded that the learning independence of fifth-grade students at SDN Gugus III Abiansemal is included in the dominant category. Data regarding the character of learning the responsibility of fifth-grade students at SDN Gugus III Abiansemal was obtained by distributing questionnaires. The sample used in this research was 92 students. Data description can be seen in [Table 6](#).

Table 6. Description of Data Regarding the Character of Students' Learning Responsibilities

Statistic analysis	Learning Responsibility
Sample	92
Maximum Score	80
Minimum Score	30
Mean	65,41
Standard Deviation	9,34
Variance	87,15

Discussion

The first hypothesis obtained a value of $F_{count} = 90.00$ and F_{table} of 3.947, so it can be concluded that the value of $F_{count} > F_{table}$ so that H_0 is rejected, which means that there is a significant influence of independent learning on the mathematics knowledge competency of fifth-grade students at Gugus III Abiansemal Elementary School. Through simple linear regression analysis, it was obtained The regression equation $\hat{Y} = 72.98 + 0.098X$. It means that there is a significant influence of learning independence on fifth-grade mathematics knowledge competency at SDN Gugus III Abiansemal. Mathematics learning outcomes can produce good results if there is a relationship between students and their teachers ([Hakim et al., 2022](#); [Niswah, 2021](#); [Sutrisno et al., 2019](#)). Mathematics is a subject that is not easy and requires sufficient time to understand it. Classroom learning is less effective if used to understand it fully, so students need independent learning to be able to understand mathematics material.

The second hypothesis obtained a value of $F_{count} = 90.01$ and F_{table} of 3.947, so it can be concluded that the value of $F_{count} > F_{table}$ so that H_0 is rejected, which means that there is a significant influence of the character of learning responsibility on the mathematics knowledge competency of fifth-grade students at Gugus III Abiansemal Elementary School through linear regression analysis. The simple regression equation obtained is $\hat{Y} = 74.644 + 0.115X$, which means there is a significant influence of the character of learning responsibility on the fifth-grade mathematics knowledge competency of SDN Gugus III Abiansemal. Learning responsibility is very important for students to have at school because a sense of responsibility will give rise to motivation and interest in participating in every activity at school (Bahar & Juhrianto, 2022; Ibrahim et al., 2020; Widiyasanti & Ayriza, 2018). By having a responsible personality, students will complete the assignments that have been received completely through maximum effort and have the courage to bear all the consequences, including grades and students' mathematical competency knowledge. The third hypothesis obtained a value of $F_{count} = 4.618$ and F_{table} of 3.099, so it can be concluded that the value of $F_{count} > F_{table}$ so that H_0 is rejected, which means that there is a significant influence of learning independence and the character of learning responsibility on the mathematics knowledge competency of class V students at SDN Gugus III Abiansemal. Through simple linear regression analysis, the regression equation $\hat{Y} = 72.682 + 0.086X_1 + 0.234X_2$. It means that there is a significant influence of learning independence and the character of learning responsibility on the mathematics knowledge competency of fifth-grade students at SDN Gugus III Abiansemal. It indicates that it is not only learning independence and the character of learning responsibility that influences students' mathematical knowledge competence (Bramantha, 2019; Indriani, 2016; Rahmadani, 2018). Apart from that, other factors influence the mathematics knowledge competency of fifth-grade students at SDN Gugus III Abiansemal, both factors from within the student and from outside the student.

This research shows that independent learning and the character of responsible learning influence the mathematics knowledge competency of fifth-grade students. Basically, achieving competence in mathematical knowledge can be optimal if the learning process in the classroom goes well. Students who have learning independence and high learning responsibility and are able to understand the learning material well will produce mathematics learning results in accordance with what is expected (Akbar et al., 2020; Fitriana, 2015; Purnomo, 2017). It will also make the student learning process in the classroom more conducive if students are able to optimize these two things. Based on the results of the research conducted, it is proven that students' independent learning and responsible learning characteristics have a positive effect on students' mathematical knowledge competence. By knowing the influence of learning independence and the character of learning responsibility on students' mathematical knowledge competence, students are expected to be able to develop further and prioritize their learning independence and learning responsibility (Astuti et al., 2018; Djabba et al., 2022; Niswah, 2021). With this, students can solve a problem using new and more relevant methods and learning resources. In addition, teachers are expected to know the influence of independent learning and the character of learning responsibility on students' mathematical knowledge competency so that teachers can provide material for consideration and input in understanding the importance of developing the independent and responsible learning character of each student in order to enable students to achieve optimal mathematical knowledge competency in student learning activities.

4. CONCLUSION

There is a significant influence of learning independence and the character of students' learning responsibility on the mathematics knowledge competency of fifth-grade elementary school students. Based on the results of this research, it is not only learning independence and the character of learning responsibility that influences students' mathematical knowledge competence, but other factors influence fifth-grade elementary school students' mathematical knowledge competence, both factors from within the student and from outside the student.

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