

## The Drill Method with Realistic Approach to Improve Learning Outcomes of Descriptive Statistics in Higher Education

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### ABSTRAK

Penelitian ini bertujuan untuk mengetahui peningkatan hasil belajar mahasiswa pada matakuliah statistik deskriptif menggunakan metode drill melalui pendekatan realistik. Penelitian ini merupakan penelitian tindakan kelas yang dilakukan selama dua siklus. Masing-masing siklus terdiri dari empat tahapan yaitu perencanaan, pelaksanaan, observasi, dan refleksi. Penelitian ini dilakukan pada mahasiswa STMIK Pringsewu kelas Callid 8 semester dua yang berjumlah 35 mahasiswa. Instrumen yang digunakan untuk mengumpulkan data dalam penelitian ini terdiri dari lembar observasi untuk mengetahui aktivitas mahasiswa selama proses pembelajaran dan tes untuk mengetahui hasil belajar. Teknik analisis data yang digunakan adalah statistik deskriptif. Hasil penelitian menunjukkan bahwa ada peningkatan aktivitas dan hasil belajar dari siklus I dan siklus II. Aktivitas mahasiswa yang diamati dalam penelitian ini adalah mencatat, bertanya, menjawab pertanyaan lisan, mengerjakan tuags di papan tulis, mengerjakan tugas di buku latihan. Hasil belajar mahasiswa pada siklus pertama diperoleh rata-rata 78,23, dan pada siklus kedua diperoleh rata-rata 87,14 sehingga terjadi peningkatan rata-rata hasil belajar sebesar 8,91. Berdasarkan penelitian ini dapat disimpulkan bahwa penerapan metode drill dengan pendekatan realistik dalam perkuliahan dapat meningkatkan hasil belajar mahasiswa pada matakuliah statistik deskriptif.

**Kata kunci:** Metode Drill; Pendekatan Realistik; Dan Hasil Belajar; Higher Education.

### ABSTRACT

This study aims to determine improvement outcomes learning in descriptive statistics was applied drill method with a realistic approach. This research is a classroom action research conducted for two cycles. Each cycle consists of four stages, namely, planning, acting, observing, and reflecting. This research was conducted on the students of STMIK Pringsewu in the second semester of the Callid 8 class, totaling 35 students. The instrument used to collect data in this study consisted of observation sheets to determine student activity during the learning process and tests to determine learning outcomes. The data analysis technique used is descriptive statistics. The results showed an increase in activity and learning outcomes from cycle I to cycle II. In this study, student activities were taking notes, asking, answering oral, working on the board, and doing assignments in exercise books. Student learning outcomes in the first cycle obtained an average of 78,23 and in the second cycle obtained an average of 87,14 so that there was an increase in the average learning outcomes of 8,91. Based on this research, it can be concluded that the application of the drill method with a realistic approach can improve student learning outcomes in the descriptive statistics course.

**Keywords:** Drill Method; Realistic Approach; Learning Outcomes; Higher Education.

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## INTRODUCTION

Higher education is formal education at the tertiary level, which is higher than secondary education at school. It is organized to prepare students to become community members by providing academic and professional skills to apply, develop, and create science, technology, and art in social life (Ahmad, 2018). It has an important role in creating competitive human resources to face the challenges of the global era in the form of the ASEAN Community so that each country must be able to prepare human resources in the labour market competition in the Southeast Asia region (Nulhaqim, Heryadi, Pancasilawan, & Ferdryansyah, 2016). Based on these two opinions, it can be concluded that higher education is formal education. It is organized to create quality human resources to become skilled, professional, innovative, and noble members in facing global challenges to compete with other countries. Therefore, the implementation of higher education is an important thing for a country, especially Indonesia, to create quality human resources and character by the objectives of Indonesia's National Education.

The achievement of the objectives of higher education is inseparable from the learning process. Learning is the process of organizing students' environment. Hence, the learning process occurs, while the study is an activity carried out by someone consciously and intentionally as an individual interaction with their environment to obtain behavior changes that are continuous, functional, positive, active, directed (Pane & Dasopang, 2017). Learning is a process of providing structured guidance to learn optimally to achieve the expected learning goals. Therefore, the learning process and study activities are an inseparable unity. In every learning process, there must be a study activity experienced by every individual who interacts with the learning environment to obtain learning outcomes in the form of better behavior changes such as knowledge, skills, and attitudes. However, not all learning processes experienced by individuals succeed by the expected learning objectives.

The learning process in higher education no longer involves teachers and pupils but involves lecturers and students. The learning process in higher education is adult learning. Adult learning is formulated to foster a desire to ask questions and learn on an ongoing basis throughout life (Yusri, 2017). Adult education is known as andragogy. Andragogy is not an activity of direct teaching but an independent learning activity or learner-centered training (Suhendro, 2014). There are four basic concepts in andragogy education, namely: self-directedness, student experience, readiness learning, and learning orientation solves problems (Anwar, 2017). In the concept of independent learning, students are assumed to be old enough to make their own decisions to increase their knowledge and generate activities through their experiences. Experience is a series of events and events that have been experienced and become a determinant of one's life value in the decision-making process. This experience distinguishes children and adults, so the experience is an essential part of adult learning activities. Therefore, to create

active and participatory learning, the lecturer must make several efforts, such as: making learning designs, preparing learning tools and media, determining active learning strategies and methods to be applied. Then the lecturer evaluates the learning processes and results applied in the classroom to determine the learning process's success.

Learning outcomes are defined as statements about what students can know and understand afterwards to complete the learning process (Harris & Clayton, 2019). More fully, Sihaloho (2018) states that learning outcomes are the results obtained by students in the form of cognitive, affective, and psychomotor after participating in teaching and learning interactions. Based on these three opinions, it can be symbolized that higher education outcomes are some behavioral changes in knowledge, skills, and attitudes from the student experience gained during the learning process that can be expressed in numbers, letters, grades, or sentences.

The process of higher education must create intelligent students who can meet their needs independently from biological, psychological, or social needs (Alba, 2011). The learning process requires an alternative method that is not boring the learning process to achieve these objectives to stimulate students to think creatively. By utilizing creative methods in learning will produce quality learning.

One of the compulsory subjects taken by the second-semester students at STMIK Pringsewu is descriptive statistics. Descriptive statistics study the methods of collecting and presenting data concisely to provide information that is easier to understand. The material learned scope includes data collection and presentation both in tables and graphs, measures of central tendency, measures of location, and measures of dispersion. The purpose of studying descriptive statistics is to collect data presenting data in tables or graphs. Then students can interpret the data sets descriptively. This ability is vital to students as a provision when working in various institutions such as politics, marketing, social, research in specific fields, and play an essential role in the country's economy. However, in learning, there are not many students who are interested in descriptive statistics. Many students complain that it is hard to learn, so students are not motivated to learn well even though they have studied hard, but it is still considered difficult to understand. As a result, not many students get a good score in descriptive statistics.

Based on data from the results of class interviews with second-semester students in 2018 at the beginning of the lecture that descriptive statistics are considered difficult subjects because of the many mathematical formulas and calculations in doing them. Students have already gotten descriptive statistics material since taking primary and secondary education levels. Students should easily understand it because they have gained experience in gradual knowledge from previous education levels. There are still many students who claim not to understand and even forget it altogether. The results of interviews with students who have followed descriptive statistics learning in the previous year, 51.29% of 39 students have stated that descriptive statistics are one of the most difficult subjects. The lecturers stated that students did not understand the formulas used, the low ability of students in arithmetic operations, and students' low ability to present and interpret data tables or graphs. Many students who have chosen to cheat assignments rather than done it themselves show low independent learning ability. This shows that there is little or no experience in the form of knowledge or skills gained during descriptive statistics learning activities at the previous educational level. These statements can be the cause of low descriptive statistics

learning outcomes. To improve the quality of descriptive statistics learning outcomes needed learning methods that can help overcome this problem, making students active in descriptive statistics learning.

For this reason, students need repeated practice to obtain skills to be able to solve problems well. This repetitive exercise activity makes students better understand the equations or formulas used, trains students to carry out calculation operations, and accustoms students to be able to present data or interpret tables and graphs. For the learning process to be meaningful, students' practice questions must also be contextual, namely practicing solving practice questions raised from students' daily lives (Kusuma, Wardono, & Winarti, 2016). Repetitive practice activities on contextual issues will make students better interpret the concepts they are learning. Therefore, one of the methods applied to descriptive statistics learning is the drill method with a realistic approach.

The drill method is a method used to provide repeated skills training to achieve dexterity or skills in doing something, where the teacher gives this exercise to students as a group or individually (Ratnaningsih, 2012). The drill method is usually used in matter calculation, foreign languages, and vocabulary enhancement (Smaldino, Lowther, Russell, & Mims, 2008). It is suitable to be applied in descriptive statistics learning because descriptive statistics is one of the subjects that use a lot of mathematical calculations such as mean, mode, and median. A realistic mathematics learning approach can be a solution to hone thinking skills, critical and creative students in learning mathematics in class. Learning mathematics is carried out by linking actual and real problems in everyday life with mathematics learning material in class (A. Irawan & Kencanawaty, 2017).

The application of the drill method in learning has several objectives. From several previous studies, an explanation was obtained from the application of the drill method to improve learning outcomes. Irawan, Sugiarto, & Kurniawan (2020) have reported the results of research that the application of the drill method in soccer extracurricular activities in Junior High School pupils can improve the skills of passing the inside legs, the outer legs, and the passing legs of the back, significantly with either category. The drill method has been applied in research to hone motor skills, so pupils have good physical skills. Kusumawati & Irwanto, (2016) stated that the drill method could make students more active in asking about the difficulties faced in solving and completing questions and training students to dare to appear in front of the class in working on the blackboard. In the results of their research, it was found that the drill method has been able to increase the average value of the final ability to solve mathematical problems on all indicators in Junior High School 7th grade. However, the research that has been done by Kusumawati and Irwanto is the application of the drill method in learning mathematics to junior high school, not at higher education. Likewise, research of Wahyuni, Rahman, & Ilyas, (2017) that the application of the drill method in learning has had a significant influence on the mathematics learning outcomes at eleventh-grade science of Senior High School. Research that has been done by Kusumawati and Indarto is the same as research done by Wahyuni et al., namely, the application of the drill method to improve mathematics learning outcomes at secondary school. Although one branch of mathematics is a statistic, as explained above, learning pedagogy for pupils is different from learning andragogy for students in higher education. These differences are the maturity of biological functions, social and psychological (Hiryanto, 2017).

Not many publications in Indonesia discuss the application of drill methods in descriptive statistics learning for higher education. The research reports about the application of the drill method are the most on secondary learning and a few studies on higher education. Fitri & Yogica (2018) researched the effectiveness of concept-based learning models, drawing, and drill methods to improve students' ability to understand concepts and high-level thinking in animal development. It results that have shown research results that student learning outcomes are satisfying both individually and classically. The research applied the drill method in the form of students' assignments individually to arrange and know the relationship of concepts learned by concept maps. Furthermore, the results of the research of Mulati & Rejeki (2014) stated that the application of the drill method was no better than the simulation method for partograph filling in students of D-III midwifery. The drill method in the study was applied by the way students worked on partograph case questions after getting an explanation in the maternity care course. Research of Muliati and Sri did not explain how many students do the exercise repeatedly because, in essence, the drill method is a method of exercise that is done repeatedly to obtain a skill. Setiowati (2016) has reported that the results of her research collaboration between somatic, auditory, visual, intellectual (SAVI) learning method and drill method can increase student activity in accounting. However, Setiowati's research is library research so that the results of the study are only in the form of conclusions from citing theories without applied the drill method in learning.

Based on the two paragraphs above, it can be concluded that previous research on the application of the drill method in secondary education is more applied than in higher education. Research publications applied the drill method in higher education are few, especially in descriptive statistics. This article will explain the drill method for learning descriptive statistics in higher education. The drill method has been chosen because it is suitable for andragogy learning, namely, by providing repeated exercises, students can learn independently (Rahmah & Hasibuan, 2019). The results of this study are expected to contribute to learning in higher education, especially lecturers who teach descriptive statistics and add references for researchers. From this study, hopefully, the drill method is a consideration to be applied in descriptive statistics before students do contextual learning or use application technology because descriptive statistics is a basic ability that must be possessed to learn advanced statistics.

Based on the background of problems, opinions, and previous studies have been described, and then the drill method was chosen as a solution to solve the problem. This study aims to improve the descriptive statistics learning outcomes in higher education by the drill methods with a realistic approach. In this study, in addition to learning outcomes, students' activities during learning were observed to find out whether students' behaviour better or not.

## **RESEARCH METHODOLOGY**

This research is a classroom action research (CAR) conducted for two cycles, namely cycle I and cycle II, by applying the drill method with a realistic approach

to improve descriptive statistics learning outcomes. The stages of applying the drill method include:

1. Planning

At this stage, various instruments will be used for learning activities, such as assessment instruments and observation sheet instruments that are used to collect facts during the learning activities.

2. Acting

At this stage, descriptive statistics learning was carried out using the drill method with a realistic approach. Students are given repeated exercises by presenting realistic data so that the solved problems are more contextual in nature. The realistic questions are described, such as data on student learning outcomes, data on students' height and weight in one class, and the number of students' family members.

3. Observation

At this stage, an observation of learning activities is carried out by the instrument that has been made.

4. Reflection

The last stage is a reflection; it is carried out after the learning process. This stage is to review the learning process that has been carried out to find out the deficiencies or goals that have not been achieved so that they can be corrected in the next cycle. If in the first cycle, there are still students who score less than 60, and independent activities such as noting and doing exercises are not 100%. It is necessary to continue to the next cycle to achieve these indicators by providing exercises using the drill method.

This study's subjects were students in the second semester of the Academic Year 2017/2018 from the study program of Information Sistem STMIK Pringsewu. The sample was all Callind 8 class students, which consisted of 35 students who were never absent during the study process.

Data collection techniques used in this study are:

1. Observation to know students' conditions and lecture situations when the learning activities take place during the study process by applying the drill method. Observation sheets in the form of checklists on student activities in class to determine the number of active students during the learning process.
2. Test to know students' descriptive statistics learning outcomes by applying the drill method. Learning outcome data obtained for each cycle is calculated on average score.

Data analysis techniques used in the study consisted of quantitative and qualitative. Quantitative techniques are used to analyze the average learning outcomes and the percentage of student activity in each cycle, while qualitative analysis techniques are used to describe student activities and study conditions in each cycle. Observation data were analyzed by calculating the average and percentage of students who carried out activities during the learning process, then describing these results and relating them to the field's reality and supporting literature. The learning outcome data is analyzed by providing a scoring of the test results then determining the minimum score, maximum score, and the classical average learning outcomes in each cycle. By calculating the average learning

outcomes for each cycle, it will be seen that there is an increase or decrease in learning outcomes. The increase in learning outcomes is associated with increased learning activities during the learning process and is analyzed with the literature.

This study's indicator of success is the increase in student activity and learning outcomes in descriptive statistics from cycle I to cycle II. The learning method's application is declared successful if all students actively take notes and work on assignments in the exercise book, and the minimum score of student learning outcomes is 60.

## RESULT AND DISCUSSION

The criterion for the success of this study is the increase in average learning outcomes and activities in descriptive statistics learning activities from cycle I to cycle II through the drill method with realistic approach. Student activities during descriptive statistics learning by applying the drill method in the first cycle are presented in table 1.

**Table 1. Data From Observations of Learning Activities Using The Drill Method on Descriptive Statistics In Cycle I**

Activity	Frequency		Average	%
	1 <sup>st</sup> meeting	2 <sup>nd</sup> meeting		
Take notes	20	34	27	77,14
Asking	6	8	7	20,00
Answering oral	5	7	6	17,14
Working on the board	1	2	1.5	4,29
Work on assignments in the exercise book	30	34	32	91,43

Based on table 1 above, it can be seen the student activities in the first cycle during the learning process with the drill method on descriptive statistics consisting of 35 students, that the lowest average activity is doing exercises on the board, because students feel ashamed or not confident to demonstrate ability in front of the class. Likewise, for the activity of asking questions and answering questions verbally with an average of 6 and 7 students, in this students' activity still feel hesitant and afraid to express their opinions and ashamed to ask questions that have not been understood. Whereas the average activity recorded for 27 students or 77,14% was obtained, and the highest activity in the first cycle was to do assignments with an average of 32 students or 91,43%. However, from table 1 above, it can be seen that the activities of students in cycle one for two meetings have increased.

Data on the results of descriptive statistics learning by applying the drill method in cycle I is presented in table 2.

**Table 2. Data on The Results of Descriptive Statistics Learning In Cycle I**

Category	Score
Minimum	50
Maximum	100
Average	78.23

Based on table 2, it can be seen by applying the drill method on descriptive statistics in the first cycle obtained an average learning outcome of 78.23 with a minimum score of 50 consisting of 2 students and the highest score of 100 consisting of 11 students from a total of 35 students.

The low activity of students and still found a minimum score of 50 in the first cycle, then learning by using the drill method in descriptive statistics, continued to the second cycle. Student activities during descriptive statistics learning by applying the drill method in cycle II are presented in table 1.

**Table 3. Data From Observations of Learning Activities Using The Drill Method on Descriptive Statistics In Cycle 2**

Activity	Frequency		Average	%
	1 <sup>st</sup> meeting	2 <sup>nd</sup> meeting		
Take notes	35	35	35	100
Asking	9	11	10	28,57
Answering oral	8	12	10	28,37
Working on the board	4	6	5	14,26
Work on assignments in the exercise book	35	35	35	100

Based on table 3, it can be seen that student activities in the second cycle during the learning process with the drill method in descriptive statistics consisting of 35 students there was an increase in the average learning activity from cycle I to cycle II. From table 3, it can be seen that in cycle II all students take notes and do the work in the exercise book. In the activity of asking and answering oral questions, an average increase to 10 students or 28,77%, there is an increase in students' courage to express their opinions or ask questions that have not been understood. Likewise, working on the blackboard also occurs in an average of 5 or 14,26%. This study concludes that the drill method can increase student activity in learning descriptive statistics.

Data on descriptive statistics learning results by applying the drill method in cycle II is presented in table 4.

**Table 3. Data From Observations of Learning Activities Using The Drill Method on Descriptive Statistics In Cycle 2**

Category	Score
Minimum	60
Maximum	100
Average	87.14

Based on table 4, it can be seen that by applying the drill method to descriptive statistics in cycle II an average learning result of 87.14 is obtained with a minimum score of 60 consisting of 2 students and the maximum score of 100 consisting of 18 students from a total of 35 students. In cycle II, in addition to an increase in average learning outcomes, there was also an increase in the minimum score from 50 to 60, then the number of students who received a maximum score of 100 also increased from 11 students to 18 students. This shows an increase in student learning outcomes in descriptive statistics with the drill method from cycle I to cycle II. Reported by Rivan, Rahmi, & Masnarivan (2018) that the application of the drill method can improve the statistics learning outcomes of STIKes Prima Nusantara students. Providing repetitive exercises will give an impression and a good learning experience for students. With mature experience and skills, students can easily take the exam so that satisfactory learning outcomes are obtained. Other research results, Rathakrishnan, Raman, & Haniffa (2018) revealed that the students who used the drill and practicing method in learning cell units show higher



performance achievement and understanding than the group who use the conventional way of learning.

The good impact of applied the drill method with a realistic approach in descriptive statistics learning is the increase in student learning activities as a change in behavior and an increase in learning outcomes because of the skills they have acquired during the learning process. Approach realistic is an approach that aims to motivate students to understand mathematical concepts by relating this concept to everyday life problems (Ningsih, 2014). The existence of student motivation to learn means increasing student interest in learning descriptive statistics to increase learning activities. The research results of Wibowo (2017) stated that learning with a realistic approach was not only effective for increasing interest in learning but also effective for increasing learning achievement. In this study, the exercises were carried out repeatedly to strengthen the students' mastery of concepts. According to Wahyuni (2016), these objectives include: 1) strengthening student learning outcomes, 2) training can expand and enrich students' knowledge and skills through activities outside of school, 3) make students active learning, and 4) motivate students to learn better. Furthermore, the research results that Wahyuni has done show that the application of the drill method can improve mathematics learning outcomes. Blegur & Lumba (2019) revealed that prospective physical education's teaching skills could improve by using the drill guide method because teaching activities related to skills require an intense and periodic drill and guidance teachers. The skills acquired by the drill method in learning because of repeated practice (Lim, Tang, & Kor, 2012)

The application of the drill method in the form of repeated exercises with the control of lecturers during classroom learning activities could make students actively involved in learning to obtain knowledge that is characterized by increased learning outcomes in descriptive statistics. Even students can perform independently outside of classroom learning with the results being controlled by the lecturer, such as by giving self-training assignments. As Kani & Sa'ad (2015) stated, the drill method has several advantages, such as ensuring the perfection of skills, making learning more permanent as it is made a habit, learning by themselves, holds what has already been grasped, reinforcement.

The application of the drill method in descriptive statistics learning in this research can increase student learning activities. Various learning activities include the willingness to take notes, ask questions as a form of curiosity, answer oral questions, or do chores on the board as self-confidence and independence to do the exercise book assignments. Such activities can be increased because of repeated training in the drill method of learning. As reported by Sutiah (2016) that applied the drill method in mathematics learning can increase learning activities. Such as being enthusiastic in doing the task, more independent and confident in doing the exercise, enthusiastic about asking questions that are not yet understood, and skilled in counting operations. So applied the drill method in learning can improve cognitive, affective, and psychomotor abilities.

The application of the drill method in descriptive statistics learning allows students to study independently through exercises. In this study, student independence is seen from the activity of taking notes and finding out about descriptive statistics that are not yet understood. Rahmah & Hasibuan (2019) reported that applied the drill method in accounting learning can increase independence learning. Such as diagnosing learning needs, choosing learning goals,

choosing learning resources, choosing learning strategies, self-control, self-learning, and working with others. The ability to learn independently is part of andragogy. In descriptive statistics learning, students are adults who study in higher education, so they must be able to study independently. The application of the drill method in higher education is useful for descriptive statistics learning.

Based on the result and discussion of research about the application of the drill method in descriptive statistics learning can improve student learning activities and learning outcomes. By involving students actively in learning, it can provide more meaningful experiences to students during the learning process that is taking place. With this experience, students can obtain some knowledge, skills, and attitudes that are better and honed to solve a problem to improve learning outcomes. With the abilities gained during the learning process at higher education, it is expected that students will become skilled and useful human beings in social life.

## CONCLUSION

Based on the results of the study shows that there is an increase in student learning outcomes in descriptive statistics by applying the drill method from cycle I to cycle II. Student learning outcomes in the first cycle obtained an average of 78.23 in the second cycle increased by an average of 87.14 so that the use of drill methods in learning can improve student learning outcomes in descriptive statistics. Suggestions for further researchers, further research is needed to find out the effectiveness of the drill method learning compared to other methods in descriptive statistics learning that involves several variables such as student motivation and mathematical intelligence.

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