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The Direct Learning Model in Mathematics: Investigating the Effect of Student's Perception on Learning Outcomes

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Abstract: ***Direct learning, in general, is specifically designed to develop students' learning activities related to procedural and declarative of knowledge aspects that can be in the forms of well-structured facts, concepts, principles, or generalization. This study was an ex-post facto aimed at analyzing the students' perceptions about the direct learning model that influenced their outcomes in learning mathematics. The location was at High School Bajo, Luwu Regency. The participants were 72 students from three regular classes. The result showed that the students' perceptions about the direct learning model influenced their outcomes in learning mathematics with Coefficient of Determination of 89.7%. The direct learning model is one of teaching approaches designed specifically to support student's learning process related to declarative and procedural knowledge that is well structured that can teach with regular pattern activity.***

Keywords: Direct Learning, Perception, Learning Outcomes

1. Introduction

The comparison between high ability students with less capable students can become an obstacle to improving the students' learning outcomes in schools. Therefore, there is a need sufficient effort to improving student's learning is necessary [1]. Many factors cause the emergence of the above learning problem, especially in mathematics. Those factors include internal factors and external factors (Dennen, 2005). Internal factors are factors that emerge from the students themselves, such as intelligence and characters. Meanwhile, external elements are factors that stimulated from outside of the students, such as environments, teaching models, and evaluation systems.

The education model possesses a significant influence on the learning goal [3]. The problem above demonstrates that mathematics teaching should be improved to increase the students' activeness as well as the outcomes. Given the importance of mathematics and its arising problems, ideally, the improvement should be started from the teacher's teaching process, that is by suggesting a learning model that can boost the students' mathematics achievement in general.
One of the ways to overcome the problem is by implementing the direct learning model. Although some practitioners achieved different alternatives such as a computer-based method [4], the direct learning model still offers many advantages. A direct learning model is a teaching approach specifically designed to support the students' learning process that is related to the declarative and procedural knowledge that is managed well and can teach with regular activity pattern. Based on the results of the preliminary observation, the mathematics teacher in senior high schools had already applied the direct learning model. Thus, the researcher was attracted to examine the students' perception of the direct learning model.

A direct learning model is a teaching approach specifically designed to support the students' learning process associated with the declarative and procedural knowledge that well structured by managing the step-by-step activity pattern. Procedural knowledge is the knowledge that notices how to do something while declarative knowledge is the knowledge about something.

The direct learning centered on the teacher, and it should ensure the students' involvement. In this case, the teacher delivers the academic material in the structured format, leads the students' activities, and examines the students' skills through practices guided and directed by the teacher. Therefore, the environment should orient to the students' assignments. Some of the characteristics of the Direct Learning Model are [5].

Direct learning model according to [6] is One of the teaching approaches specially designed to support student learning process related to declarative knowledge and well-structured procedural knowledge that can teach with gradual, step-by-step pattern of activities. The direct learning emphasizes on the learning goals that must be oriented to the students and must be specific, which contains a clear description of the research situation (evaluation conditions) and the level of expected performance accomplishment (success criteria). Also, direct instruction and example enrich teacher-student interactions [7].

The direct learning model is a learning model that emphasizes the mastery of concepts and / or behavioral changes by prioritizing the deductive approach, with the following characteristics: (1) direct transformation and skill; (2) learning oriented toward a particular purpose; (3) learning materials that have been structured; (4) a structured learning environment; and (5) structured by teachers. The teacher acts as a transmitter of information, and in this case, the teacher should use appropriate media, such as films, tape recorders,

pictures, demonstrations, and the like. The information conveyed can be either procedural knowledge (i.e., understanding of how to implement something) or declarative knowledge, (i.e., the experience of something can be fact, concept, principle, or generalization). Critics of using this model include that this model cannot be used at all times and not for all learning purposes and all students.

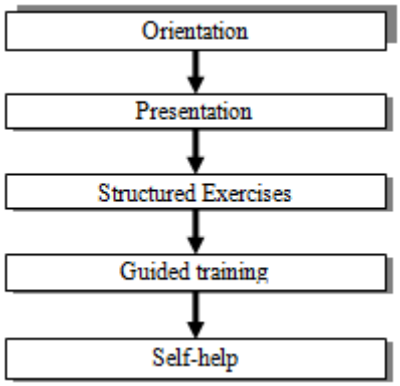

Figure 1: The flow of direct learning model activities

Fig 1 show Stages or syntax of direct learning model according to [8] as follows:

- Orientation. Before presenting and explaining the new material, it will be helpful for the student if the teacher provides a lesson framework and direction to the content to deliver. Forms of adjustment may be: (1) preliminary activity to know the knowledge relevant to the education that has been owned by students; (2) discuss or inform the learning objectives; (3) provide explanation / direction about the activities to be performed; (4) report the materials / concepts to be used and activities to be undertaken during the lesson; and (5) inform the lesson framework.
- Presentation. In this phase, the teacher can present the subject matter either in the form of concepts and skills. The introduction of the material may be: (1) presentation of the material in small steps so that students can master the material in a relatively short time, (2) giving examples of concepts; (3) modeling or demonstration of skills by way of illustration or explanation of work steps on the task; and (4) to re-explain difficult things.
- Structured Exercises. In this phase, the teacher guides the students to do the exercises. The vital role of teachers in this aspect is to provide feedback on student responses and to reinforce correct student responses and correct student responses.
- Guided training. In this phase, the teacher provides the opportunity for students to practice concepts or skills. This good guided exercise is also used by teachers to assess/assess students' ability to perform their duties. In this phase, the role of the teacher is to monitor and provide guidance if necessary.
- Self-help. In this phase the students do the exercises independently, this aspect can be passed by the students if they have mastered the stages of 85-90% artistry in the step of training guidance.

2. Method

The approach used in this study was quantitative. This research type was ex-post facto study. The research work conducted in High School Bajo, Bonelemo Village, Luwu District of West Bajo. The population in this study was the students of the eleventh-grade classes of High School Bajo, consisted of three parallel classes with 72 students. The whole class population participated in this study.

There were two kinds of data used in this study; they were primary data in the form of a questionnaire on the students' perceptions about the direct learning model, and the secondary data in the form of the documentation of the students' mathematics learning outcomes. Before given to the participants, the test instrument had validated by the subject matter experts and the reliability test employed the Cronbach's alpha formula. Then, descriptive analysis applied to the results of the questionnaire by calculating the response percentages using response categorization [9].

3. Result and Discussion

Direct learning model or known as direct instruction is a learning model that focuses on mastery of concepts and also behavioral changes by making a deductive approach. Here the role of the teacher is significant as a transmitter of information, so it should be a teacher utilizing various facilities such as tape recorders, movies, demonstrations, drawings and so forth. The data can submit in the form of knowledge that is both procedural and declarative knowledge.

The distribution of learning outcome respondent consists of five categories (Figure 2).

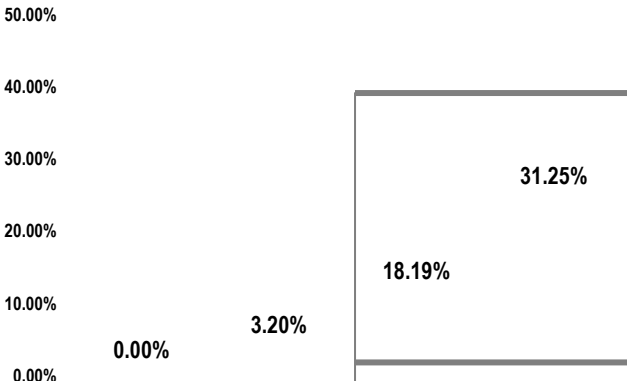

Figure 2: The Learning Outcome Distribution

The result of research indicated that the learning outcomes dominated by high category (81- 100). However, there were 3.20% students with the low category. The student perception also consists of five groups (Fig. 3).

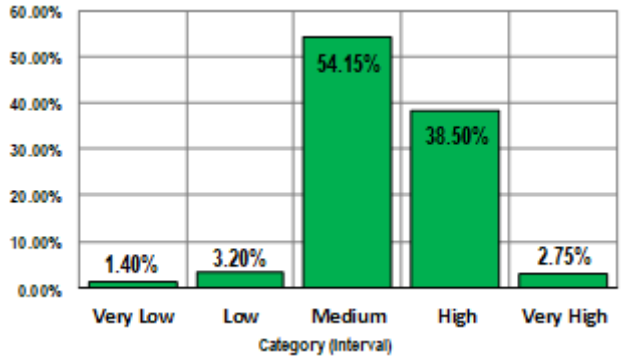

Figure 3: The Student Perception

Figure 3 shows that many students (54.15%) have a good perception of the learning model. Based on the validity test, it obtained that all of the statements in the questionnaire were valid and reliable. Based on the correlation analysis, it got that r = 0.947, with a coefficient of determination (CD) = 89.7%. It indicated that the influence of the direct learning model on the math learning outcomes of High School Bajo was 89.7% while other variables determined the remaining of 10.3%. Other variables that influenced the direct learning model could come from several factors, both internal and external.

Descriptively, the students' math learning outcomes in the eleventh grade of High School Bajo in the middle of the semester of the academic year 2015/2016 categorized as "good" with the average score of math learning outcomes 83.93. The direct learning model had an influence on the students' math learning outcomes in the eleventh grade of XI High School Bajo in the academic year 2015/2016 at the level of 5% with CD up to 89.7%. Thus, the outcome in learning math of the eleventh grade of High School Bajo was influenced by the direct learning model, and other variables determined the rest of 10.3%.

The perception of the students at High School Bajo (academic year 2015/2016) on the direct learning model in the math class was in the medium category. The mean score was 55.65, with 85.131 variances and 9.23 standard deviation from the ideal score of 100. Meanwhile, the range of the scores achieved was at 36, where the lowest score was 40, and the highest score was 76.

Students' perceptions of the mathematics learning model influence the learning motivation. Student learning motivation is characterized by active in the class in doing the task. Student's feedbacks proven on the results of the exercise. With these feedbacks will give high learning results. Direct learning model by the characteristics of students who quickly understand the practice. Suitable for mathematics lessons that are difficult for students to understand.

In general, each model of learning, of course, some advantages make the learning model is better to use compared to other learning models [8], [10], [11]. As in Direct Instruction Model or direct learning model also has several advantages that are as follows:

- With the direct learning model, the teacher controls the content of the material and the sequence of information received by the student to maintain focus on what the student should achieve.
- Can be efficiently applied in large and small classes.
- It is the most efficient way to teach explicit concepts and skills to low-performing students
- The Direct Instruction Learning Model emphasizes listening (through lecture) activities to help suitable students learn in these ways. With Lectures, it is useful to convey information to students who do not like to read or who lack the skills in organizing and interpreting data and to convey knowledge that is not directly available to students, including relevant examples and current research results.
- Direct Instruction Learning Model (especially demonstration activities) can provide a challenge to consider the gap between theory and observation. Students to concentrate on the outcomes of a task and not the techniques in producing it. Is especially important if students do not have the confidence or skill in performing the function.
- Students who cannot self-directed can still excel if the direct learning model used efficiently.

Besides having the advantages - these advantages of direct learning also has shortcomings such as the following:

- In the immediate learning model, it is difficult to overcome differences in skills, early knowledge, education and understanding levels, learning styles, or student interests
- Because students have few opportunities to be actively involved, it is difficult for students to develop their social and interpersonal skills.
- Because teachers play a central role in this model, the success of this learning strategy depends on the teacher's image. If teachers are not looking ready, knowledgeable, confident, enthusiastic, and structured, students can become bored, distracted, and their learning will hampered.
- The direct learning model relies heavily on the teacher's communication style. Poor communicators tend to produce poor knowledge as well, and direct instructional models limit the teacher's chance to display many positive communication behaviors.
- If the direct learning model does not involve many students, the student will lose attention after 10-15 minutes and will only remember a small amount of material delivered

4. Conclusions

The direct learning model had five different stages. The results found that the direct learning model contributed significant variance to the student's learning outcomes, mainly when they study Mathematics. Regarding students' perception, on average, the students had medium level perception toward the direct learning model. Although the direct learning model brings a positive effect to learning, students' perception towards the model should also be improved. Future studies should consider alternative intervention in changing students' perception towards

particular learning model as it contributes significant effect to learning outcomes.

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