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Implementation of Differentiated Content Learning Based on Students' Learning Readiness in the Material of Presenting Data in the Form of Scatter Diagrams

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Abstract

The Implementation of Content Differentiated Learning Based on Students' Readiness in the Topic of Presenting Data in the Form of a Scatter Plot in Class XI-7 of SMA Negeri 1 Jayapura. This research is a descriptive qualitative study aimed at describing the implementation of content differentiated learning based on students' readiness in the topic of presenting data in the form of a scatter plot. The subjects of this study were 37 students from Class XI-7 of SMA Negeri 1 Jayapura, selected through purposive sampling technique.. The research instruments used included a teaching module, diagnostic assessment, individual test, and teacher observation sheet. The results of the diagnostic assessment were used to categorize students into three levels of readiness: low, medium, and high. Students were grouped into seven groups: three low-readiness groups, three medium-readiness groups, and one high-readiness group. The differentiated learning was implemented effectively, as indicated by the teacher's observation score of 86.875% and the peer observer's score of 88.125%, both of which fall under the "very good" category. The results of the individual test showed that 27 out of 37 students (72,97%) met the KKM, while 12 students (27,03%) did not. Among the medium- readiness group, 5 students did not meet the criteria, and among the low-readiness group, 5 students were not yet successful. These findings indicate that content-differentiated learning positively impacts students' learning outcomes, although further support is needed for those in the low-readiness group.

Kata Kunci: *content differentiated learning, learning readiness, scatter plot.*

INTRODUCTION

Education has an important role in the formation of intellectual abilities and skills of students. In line with the opinion of Juari & Nugraheni (2024) that education is a process of educating students so that they can optimize and develop cognitive, affective and psychomotor abilities. Education requires careful planning so that learningoriented to the goals to be achieved and can answer the needs of students in developing their potential. In a class, of course, it consists of students who have various backgrounds, learning readiness, interests, talents, and learning styles. Based on the researcher's observations during the mathematics learning process at SMA Negeri 1 Jayapura, it is known that students have diverse characteristics, both in terms of initial knowledge, learning styles, interests, and speed of understanding the material. However, the learning approach used by the teacher is still conventional, where all students are given the same material and treatment.

Each student needs different teaching so that students can understand the competencies and learning materials according to their characteristics and uniqueness so that they can develop optimally. Learning differentiate is the right learning for teachers to use in adjusting teaching to the diverse needs of each student. In line with (Andajani, 2022) that differentiated learning is learning in which teachers use various teaching methods to meet the needs of each student according to their needs.

Tomlinson (Purba, 2021) stated that one of the applications of learning is differentiated, namely content-differentiated learning. Content-differentiated learning refers to the content or material delivered by teachers to students by mapping students' learning needs. This mapping is based on students' learning readiness, abilities, and interests. The results of the mapping are used to group students into groups, one of which is based on the level of learning readiness. The group consists of groups of students who have understood the basic/prerequisite material, groups that still need reinforcement and direct guidance from teachers, and groups that are ready to be

challenged (Danuri et al., 2023; Purba, 2021).

In the implementation of content differentiation learning, the learning objectives remain the same, but teachers need to provide materials based on students' readiness to understand the material being taught. Based on research conducted by Dian Fitriani et al. (2023), through content differentiation learning, each student who has different learning readiness can participate in learning activities well. In line with research conducted by Salamah et al. (2023), differentiated learning can accommodate the diversity of students and enable effective learning according to students' learning readiness. Even though the level of learning readiness is different, students can still participate in learning well according to their respective abilities.

Learning readiness is the extent to which students' knowledge and skills support the achievement of learning objectives (Purba, 2021). Learning readiness has a clear influence on student development in the learning process, making it easier for students to receive the material taught by the teacher. According to Rifqiyah & Nugraheni (2023), if students have not achieved learning readiness to complete learning tasks, they will experience difficulties and even feel hopeless.

Based on the results of the researcher's interview with the mathematics teacher of SMA Negeri 1 Jayapura on February 7, 2025, there were still many students who were not ready to take part in the learning process in class due to a lack of knowledge of the prerequisite material. This causes students to have difficulty understanding the material given by the teacher, as a result, students are not ready to receive the lessons taught by the teacher. In line with the research of Novita & Tindangen (2022) that students who have not fully mastered the prerequisite material will find it difficult to learn the next material. Thus, initial knowledge or prerequisite material has a very important role in determining students' learning readiness.

One of the materials that requires mastery of prerequisites is the material on presenting data in the form of scatter plots. The material on presenting data in the form of scatter plots has several prerequisites that must be mastered by students so that they can understand and present data in scatter plots properly. First, students need to understand the Cartesian Coordinate system, including how to read and place points on the X and Y axes. Without this understanding, students will have difficulty presenting data in the form of scatter plots. Second, students must be familiar with independent and dependent variables.

Based on the description, the researcher feels it is important to conduct this research because based on the results of the researcher's observations regarding the learning process at SMA Negeri 1 Jayapura which shows that the conventional approach has not been able to accommodate the learning needs of each individual who has diverse characteristics optimally. The researcher believes that the application of differentiated learning, especially content differentiation based on learning readiness, is the right solution to create more effective learning. Therefore, this research is expected to contribute to developing learning strategies that are more responsive to the diversity of students in the classroom.

Based on the explanation above, the researcher decided to conduct a study entitled "Implementation of Differentiated Content Learning Based on Students' Learning Readiness on the Material of Presenting Data in the Form of Scatter Diagrams in Class XI-7 of SMA Negeri 1 Jayapura".

METHOD

The type of research used is descriptive qualitative research. This research is intended to describe or describe the actual condition of a research object. This research aims to describe the application of differentiated content learning based on students' learning readiness on the material of presenting data in the form of scatter diagrams in class XI of SMA Negeri 1 Jayapura.

RESULTS AND DISCUSSION

1. Diagnostic Assessment Data

Based on the results of the diagnostic assessment, students were grouped into groups with low, medium, and high learning readiness. Researchers divided

students into 7 homogeneous groups, namely 3 groups with low learning readiness, 3 groups with medium learning readiness, and 1 group with high learning readiness. The grouping is based on the results of the diagnostic assessment analysis which is then used to design learning that can meet students' learning needs. This is in line with Kuswanto Arif (2023) that diagnostic assessment is a series of activities carried out specifically to see the competencies, weaknesses or difficulties of students, so that teachers can adjust the material to be taught based on the competencies and conditions of students.

The analysis of the assessment results was carried out by looking at how many prerequisite material questions could be answered correctly by students. Students who successfully answered questions 1 to 4 were categorized as a high group. This means that students in the high group have good initial abilities in the prerequisite material because they are able to understand how to plot points on Cartesian Coordinates, determine the values of points on Cartesian Coordinates, determine independent (free) and dependent (bound) variables, and define scatter diagrams clearly. Students who could not answer or only managed to answer two questions between Numbers 1 to 3 were categorized as low group. This means that students in the low group have insufficient initial abilities in the most basic prerequisite material because students have not been able to understand how to plot points on Cartesian Coordinates, determine the values of points on Cartesian Coordinates or determine independent (free) and dependent (bound) variables. Meanwhile, students in between the two are categorized as a medium group, meaning that students have quite good initial abilities in the prerequisite material.

Teacher Observation Data

Based on the results of observations of the implementation of differentiated content learning based on students' learning readiness, the percentage score obtained by the mathematics teacher was 86.875% and by fellow researchers 88.125%. Both percentage scores indicate that the implementation of differentiated content learning based on students' learning readiness is included in the very good category. From the score obtained in each aspect observed, it shows that the teacher has carried out all the steps in the learning process according to what has been arranged in the teaching module.

In the implementation of learning, researchers distribute LKPD that researchers have made where LKPD differs based on students' learning readiness, namely low, medium, and high group LKPD. This is in line with Tegeh's opinion (Febrianti, 2019) that the implementation of differentiated learning begins with a diagnostic assessment by the teacher as a basis and consideration for preparing learning plans including LKPD so that based on the results of the assessment, teachers can design differentiated LKPD, one of which is differentiating content based on students' learning readiness.

The questions presented by researchers in LKPD vary according to the abilities of students. Each LKPD in each group consists of two questions on presenting data in the form of scatter diagrams with different levels of difficulty between LKPD low, medium, and high groups. The difference in the level of difficulty of working on LKPD questions in low, medium, and high groups is seen from the amount of data, the size of the numbers, and the variety of questions.

In addition, during the LKPD work, the researcher monitored and guided the low group more, but still paid attention to the medium and high groups. In the high group, the researcher would approach to provide assistance if the high group had difficulties and needed assistance. Providing assistance during the LKPD work is in accordance with the scaffolding concept in Vygostky's theory where

assistance is given in stages to students during the learning process according to the needs of the students (Erawati & Astarini, 2023). Assistance is only given when students have difficulty in certain parts of the LKPD work. While in other parts, students are given the opportunity to think about how to solve the questions in the LKPD.

Individual Student Test Results

Based on the results of the individual test, it is known that out of 37 people, 27 people (72.97%) have met the Minimum Completion Criteria (KKM) set by the school, which is 70. Meanwhile, 10 other people (27.03%) did not complete it. Students who have not completed it come from the low and medium learning readiness groups. There are 5 people from the medium group who have not completed it, while from the low group there are 5 people who have not achieved completion.

Based on the results of the individual tests, the researcher conducted an analysis of the individual test answer sheets of students who had not met the KKM. Based on the analysis of their answer sheets, it was found that most students from both the medium and low groups made mistakes in setting the X and Y axis number scales on the Cartesian Coordinates. These errors caused the results of plotting data points on the scatter diagram to be inaccurate. Many students did not pay attention to the difference in distance between numbers consistently so that the scale used was not appropriate. As a result, the points plotted on the scatter diagram were inaccurate and did not represent the data accurately.

Furthermore, based on the results of individual tests, it was found that some students from the low readiness group obtained higher scores compared to some students from the high readiness group. After reviewing the students' answer sheets, the researcher found that the individual test instrument had not fully differentiated the level of difficulty of the questions. The questions worked on by the students were still at the same level of difficulty, not divided based on the level of readiness of the students. As a result, students from the low group were able to answer well because the level of difficulty was still within their cognitive reach.

Other factors as well influence is that high group students tend to make mistakes due to a lack of accuracy, such as incorrectly determining the axis scale in Cartesian Coordinates So that plotting the points becomes inaccurate, even though conceptually they have understood the material. On the other hand, low group students are more careful and detailed in answering questions. This can happen because of the assistance and provision of assistance to students from the low group that is more intensive during the learning process which is one of the reasons why low group students successfully answer individual tests. the comparison must also be explained. From the research that has been conducted, researchers found several advantages of differentiated content learning based on students' learning readiness, namely:

By implementing differentiated content learning based on learning readiness, students' learning needs can be met, making it easier for students to understand the material being taught.

By adjusting the learning materials based on the level of learning readiness, content-differentiated learning allows students to learn at a level that suits their abilities. This will increase students' self-confidence and engagement in the learning process because they get materials according to their respective ability levels.

By implementing differentiated learning, students can interact with other students who have the same abilities so that they can improve cooperation between each other and not just depend on one or two people who they think understand more than them.

CONCLUSION

Based on the research results and discussion, the researcher drew the following conclusions:

1) The implementation of differentiated content learning based on learning readiness in the material of presenting data in the form of scatter diagrams has been carried out very well as indicated by the learning implementation score given by the teacher of 86.875% and fellow researchers of 88.125%.
2) The results of individual tests showed that 27 out of 37 people (72.97%) had achieved
   KKM, while 10 people (27.03%) have not met the KKM value set by the school, namely 70. Students who did not complete the KKM came from the low group and in progress. From the medium readiness group, there are 5 people who have not finished, while from the low readiness group there are 5 people who have not finished.
3) The students' failure to complete the task was mostly caused by errors in determining the X and Y axis scales in the Cartesian Coordinates so that the results of plotting the points on the scatter diagram were inaccurate. This shows that the mastery of the prerequisite material, especially the material on plotting points on Cartesian coordinates, is still lacking and needs to be improved.
4) There are several advantages of differentiated content learning based on students' learning readiness, namely:
   a. By implementing differentiated content learning based on learning readiness, students' learning needs can be met, making it easier for students to understand the material being taught.
   b. By adapting teaching materials based on the level of learning readiness, content-differentiated learning allows students to learn at a level that suits their abilities.
5) There are several shortcomings in content-differentiated learning, including limited time in assisting groups, especially groups of students with low readiness, and inadequate accommodation of students' mastery of prerequisite material, especially in groups with low learning readiness.

SUGGESTION

The implementation of content-differentiated learning in this study generally went well as indicated by the results of observations by teachers and fellow researchers which showed a very good category. However, there are several obstacles when implementing content-differentiated learning based on students' learning readiness that need to be considered: It takes longer to carry out learning. The implementation of content-differentiated learning requires teachers to provide different teaching materials and assistance for each learning readiness group. Teachers must divide their focus to assist low groups while still paying attention to medium and high groups. Time constraints in learning are a challenge in themselves, especially in providing assistance to groups with low readiness, which actually require more attention.

1. Differentiated content learning requires mature teacher readiness, starting from conducting and analyzing diagnostic assessments, compiling varied teaching materials adjusted to students' learning readiness, to monitoring the development of each group during learning. In large class conditions such as in this study, namely 37 students, the teacher's responsibility becomes more complex because they must provide fair attention to each group. If not supported by sufficient time allocation, supporting facilities, and appropriate training, the implementation of differentiated learning is at risk of not going well.

Based on the results of this study, several suggestions can be given as follows:

1. **For Schools**
   The school is expected to be able to support and facilitate teachers at the school through workshop or training to improve competence in implementing differentiated learning.
2. **For Teachers**
   a. Teachers are expected to be able to plan and prepare differentiated learning well because the

implementation of learning...differentiate it takes quite a long time.

b. Teachers are advised to prepare and implement diagnostic assessments.

able to measure students' learning readiness accurately.

c. Teachers must ensure that students have mastered the prerequisite material before moving on to the material to be taught.
d. Teachers are advised to improve their skills in classroom management, especially in learning differentiate which requires attention to differences in students' levels of learning readiness.

3. For Further Researchers

a. It is recommended to conduct further research about application of differentiated learning in large classes, in order to find more effective strategies in time management and mentoring students in class.
b. It is recommended to consider the most appropriate diagnostic assessment method so that the process of grouping students becomes more accurate according to each student's learning readiness.

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BIBLIOGRAPHY

Andajani, K. (2022). Modul Pembelajaran Berdiferensiasi. *Mata Kuliah Inti Seminar Pendidikan Profesi Guru*, *2*.

Danuri, Waluyo, S. ., Sugiman, & Sukestiyarn, Y. (2023). *Model Pembelajaran Berdifer ensiasi untuk Sekolah Dasar Inklusif*.

Dian Fitriani, Fatihatunnisa Ridha Rahman, Anti Dhamayanti Fauzi, Anisa Umu Salamah, & Asep Saefullah. (2023). Implementasi Pembelajaran Diferensiasi Berdasarkan Aspek Kesiapan Belajar Murid di Sekolah Menengah Atas. *Jurnal Genta Mulia*, *14*(2), 1– 12. https://doi.org/10.61290/gm.v14i2.358

Erawati, N. K., & Astarini, M. H. (2023). Penerapan Scaffolding Sebagai Upaya Meningkatkan Aktivitas Belajar Matemati ka Siswa. *Emasains: Jurnal Edukasi Matematika Dan Sains*, *12*(1), 59–70.

Febrianti, F. (2019). Efektivitas Penggunaan Media Grafis Dalam Meningkatkan. *Prosiding Seminar Nasional Pendidikan FKIP Universitas Sultan Ageng Tirtayasa*, *2*(1), 667– 677. http://jurnal.untirta.ac.id/index.php/psnp/article/view/5737

Juari, E. W. D. R. A., & Nugraheni, N. (2024). Analisis Kesiapan Belajar Siswa pada Pembelajaran Perdiferensiasi. *Jurnal Riset Pendidikan Dasar (JRPD)*,

5(1),43.https://doi.org/10.30595/jrpd.v5i1.16064

Kuswanto Arif. (2023). Analisis Asesmen Diagnostik Terhadap Proses Pembelajaran Berdiferensiasi Pada Peserta Didik. *Jurnal Evaluasi Dan Pembelajaran*, *5*(2), 112–119https://jepjurnal.stkipalitb.ac.id/index.php/ hepi

Novita, L., & Tindangen, M. (2022). Identifikasi Kesiapan Belajar Peserta Didik Dalam Proses Pembelajaran Biologi Berbasis Pratikum. *Seminar Nasional PendidikanProfesi Guru Tahun 2022*, 127–132.

Purba, M. (2021). Pembelajaran Berdiferensiasi (Differentiated Instruction).

Rifqiyah, F., & Nugraheni, N. (2023). Analisis Kesiapan Belajar Siswa untuk Pemenuhan Capaian Kurikulum Merdeka dengan Pembelajaran Berdiferensiasi. Jurnal Riset Pendidikan Dasar (JRPD), 4(2), 145. https://doi.org/10.30595/jrpd.v4i2.16052

Salamah, A. U.,Anti DhamayantiFauzi, Daryanti Wahyu Lestari, Dian Fitriani, & Asep Saefullah(2023).PenerapanPembelajaran erdiferensiasi Berdasarkan Kesiapan Belajar Di Tingkat Sekolah Menengah Atas. Eksponen, 13(2),126135.https://doi.org/10.47637/eksponen.v13i2.7 20