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Unraveling the Merdeka Curriculum: Exploring Differentiated Instruction's Impact on Student Learning

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UNRAVELING THE MERDEKA CURRICULUM: EXPLORING DIFFERENTIATED INSTRUCTION'S IMPACT ON STUDENT LEARNING

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Abstract

Differentiated instruction, as the application of the 'teaching at the right level' principle, which involves tailoring teaching to student's needs and the diversity of their interests and readiness, needs to be developed in Merdeka Curriculum implementation. This research aimed to measure the influence of learning components, including variables such as planning, implementation, and learning assessment, as well as learning elements, including variables such as content, processes, learning outcomes, and the learning environment, on the potential for differentiated instruction in elementary and secondary education. This research employed a quantitative method, using path analysis to measure the significance of the influence of independent variables (learning components and learning elements) on the potential for differentiated instruction. The results indicated that three variables significantly influence the Potential for Differentiated Instruction (Y), namely: Learning Components/ Learning Assessment (X₃) with a t-value of 12.817 > t_{table} 1,985; Learning Elements/ Learning Processes (X₅) with a t-value of 10.223 > t_{table} 1,985; and Learning Outcomes/ Achievements (X₆) t-value 9.817 > t_{table} 1,985. Thus, the potential for differentiated instruction in Merdeka Curriculum implementation in elementary and secondary education can be maximized if teachers can plan and implement learning assessments accurately, manage differentiated instruction processes, and apply differentiated instruction outcomes.

Keywords: *Differentiated Instruction; Merdeka Curriculum; Learning Components; Learning Elements.*



A. Introduction

Differentiated instruction is one way for teachers to meet the needs of each student because it is a teaching and learning process in which students can learn the subject matter according to their abilities, preferences, and individual needs, thus preventing frustration and feelings of failure in their learning experiences (Kemendibudristek, 2021:26-27). Teachers need to create lesson materials, daily activities, homework assignments, and final assessments according to the readiness of students to learn the subject matter, students' interests in learning, and how to deliver the lessons that align with the learning profiles of their students (Breaux & Magee, 2010; Fox & Hoffman, 2011; Tomlinson, 2017).

The implementation of the Merdeka Curriculum places significant emphasis on the application of differentiated instruction (Kemendibudristek, 2022). This emphasis is because differentiated instruction adheres to the principle of "teaching at the right level", which means tailoring instruction to meet the needs diverse interests, and readiness of students (Eva Latipah & Hasan, 2023; Amaly et al., 2023).

Several previous studies that shed light on the importance of research regarding differentiated instruction can be explained below. Wardani, et al., (2023), mentioned that the implementation of the 2022 Merdeka Curriculum aims to enhance the quality of learning and strengthen character education through the reinforcement of the Pancasila student profile program.

As noted by Hasanah, et al., (2022), the implementation of differentiated instruction is a new development in the context of the Merdeka Curriculum and the Pancasila Student Profile in Indonesia. According to Rosinta, et al., (2019), students who participate in differentiated instruction show better improvement in their ability to solve mathematical problems compared to students in conventional learning environments. Additionally, the impact of classrooms implementing differentiated learning includes making every student feel welcome, valuing students with various characteristics, creating a sense of safety, and fostering collaboration between teachers and students (Veni, 2021). Zhaffar and Rashed (2022) explained that in differentiated instruction, teachers need to enhance open feedback, be

willing to listen to students' perspectives, use praise and criticism selectively, and act as student advocates to foster a democratic classroom environment.

Considering the scope and principles of differentiated instruction, there are at least two concrete challenges faced by teachers in differentiated learning: implementing the components of learning (planning, execution, and assessment) and implementing differentiation elements (content, process, outcomes, and learning environment) (Eva Latipah & Hasan, 2023; Faisal et al., 2021).

Empirically, differentiated instruction in the implementation of the Merdeka Curriculum encompasses three components of learning: planning, implementation, and assessment. These three components of differentiated instruction are closely related to curriculum adjustments (Sukiman et al., 2021; Faisal et al., 2021; Faidi et al., 2021). Mavidou and Kakana (2019) explain that differentiated instruction is an approach that necessitates adequate adjustments to various aspects of the curriculum to effectively meet the needs of all learners. In the implementation of differentiated instruction, as outlined by Lavania and Nor (2021), teachers need to consider aspects related to curriculum, teaching, differentiated instruction knowledge, school, students, time, and workload.

Effective lesson planning for differentiated instruction becomes a crucial factor in achieving learning objectives. As explained by Mirawati, et al., (2022), differentiated instruction also poses challenges, such as time constraints, misconceptions about unfair treatment, and class size. Therefore, improved lesson planning is essential before implementing differentiated instruction to achieve optimal results. One of the crucial components of differentiated instruction is learning assessment. Westbroek, et al., (2020) explains that assessment for differentiated instruction focuses on the learning process and positively impacts student learning outcomes. However, assessment in differentiated instruction can be a challenging step for teachers.

Empirically, there are several challenges and obstacles in the implementation of the components of differentiated instruction. Putra (2023) explains that many studies have found misconceptions among



teachers, not only in the practice of differentiation but also due to low self-efficacy and motivation among teachers. Furthermore, Putra (2023) suggests that we need to address these barriers because teachers' misunderstandings are significant obstacles to implementing differentiated instruction in the classroom. Research by Ginja and Chen (2020) mentions inhibiting factors in the implementation of differentiated instruction, including a limited number of trained teachers, misconceptions about differentiated instruction, large class sizes, limited access to teacher professional development training, and a lack of learning facilities. Several strategic steps can be taken to overcome teachers' obstacles in implementing differentiated instruction, including (a) managing class schedules to avoid lengthy durations, regulating the number of students and class sizes; and (b) providing training facilities and developing teachers' competencies in managing differentiated learning (Fitri et al., 2020; Muhith et al., 2023).

Differentiated instruction should ideally consist of four elements that teachers can differentiate, namely: the content/ materials to be taught, the meaningful activities or processes that students will engage in the classroom, assessments in the form of products/ results that measure the achievement of learning objectives, and the learning environment (Kemendikbudristek, 2021). As explained by Ismajli and Morina (2018), in the implementation of differentiated instruction, teachers tend to focus more on the products and may not emphasize the content and the learning processes enough. This is influenced by teachers' understanding and capability in differentiated instruction, which may not be adequate. One critical aspect of differentiated instruction is the use of varied assessments to measure learning outcomes, which can encompass the four elements of learning (Fithriani et al., 2021; Sujatmiani, 2024). Elmer (2022) revealed that students have a positive perception of using different assessments in differentiated instruction. This approach also significantly improves students' performance as measured before and after instruction.

Regarding assessments, assessment instruments for the elements of differentiated instruction have been developed. Marlina, et al. (2023), explained that an assessment instrument for differentiated instruction has been



developed, comprising four aspects: (1) content, (2) process, (3) product, and (4) learning environment. These instruments have been validated for reliability and are suitable for use with a high degree of reliability. Implementing this assessment strategy has led to improvements in teachers' skills and the engagement of students with special needs in differentiated instruction.

This research aims to measure the influence of learning components, including variables such as planning, implementation, and learning assessment; as well as learning elements, including variables such as content, processes, learning outcomes/ achievements, and the learning environment, on the potential for differentiated learning in elementary and secondary education within the implementation of the Merdeka Curriculum.

The social and academic implications of this research are: (1) obtaining an overview of the potential application of differentiated instruction covering learning components and differentiation elements; (2) obtaining empirical results measuring the influence of each dimension within learning components and differentiation elements, which could serve as a theoretical reference.

B. Method

1. Research Design

This research employs a quantitative method, using path analysis to examine the influence of learning components, including variables such as planning, implementation, and learning assessment; as well as the elements of differentiated instruction, encompassing variables such as content, processes, learning outcomes/ achievements, and the learning environment, on the potential for differentiated learning in elementary and secondary education units.

2. Research Location and Subjects

The research was conducted in the Central Java region, with the study subjects including the following educational institutions: SD Negeri 2 Sampangan, Semarang City; SD Negeri Guyangan, Pati Regency; SMP Negeri 1 Kaliwungu, Kendal Regency; SMA Negeri 2 Ungaran, Semarang



Regency; SMA Negeri 2 Semarang City; SMK Negeri 2 Slawi, Tegal Regency; SMK Negeri Jawa Tengah, Semarang. The data sources/ respondents for this research included a total of 110 subject teachers.

3. Data Collection Techniques and Instruments

The data collection technique involved the use of a survey, using a questionnaire as the instrument. The questionnaire has been subjected to validity and reliability testing and has been validated. The data was collected using a questionnaire technique with an instrument in the form of a survey distributed to 110 subject teachers in primary, junior high, senior high, and vocational schools in the Central Java Region. The questionnaire contained scaled responses describing the conditions of two aspects of differentiated instruction: learning components (planning, implementation, and assessment) and learning elements (content, process, outcomes, and environment). The scale used was: 4 for highly applicable/ implemented, 3 for applicable/ implemented, 2 for less applicable/ implemented, and 1 for not applicable/ implemented.

4. Data Analysis Technique

The respondents' answers were analyzed quantitatively. Data analysis was conducted using path analysis. Path analysis is an extension of multiple linear regression. Path analysis involves using multiple linear regression analysis to estimate the causal relationships among variables (causal model) that have been predetermined. There are two aspects to the analysis of influence: 1) Learning components, which include variables such as lesson planning, lesson implementation, and learning assessment; 2) Learning elements, which include variables such as content, processes, learning outcomes/ achievements, and the learning environment.

The influence of these variables on the potential for differentiated learning in elementary and secondary education units was measured. Regression analysis was performed using the SPSS program version 19.0 (Ghozali, 2012) to analyze the relationships between the following variables: (1) For Components of Differentiated Instruction: Lesson Planning (X_1);

Implementation (X_2); and Assessment (X_3). These were analyzed about the Potential for Differentiated Learning (Y). (2) For Elements of Differentiated Instruction: Content/Materials (X_4); Process/ Teaching Method/Strategy (X_5); Learning Outcomes/ Achievements (X_6); and Learning Environment (X_7). These were analyzed about the Potential for Differentiated Learning (Y).

C. Result and Discussion

1. Result

a. Path Analysis

Multiple linear regression analysis was used to examine the influence of independent variables on the dependent variable. The results of the multiple regression analysis using SPSS version 19.0 are as follows.

1) Multiple Linear Regression Analysis of Differentiated Instruction Components

Based on the analysis results using SPSS version 19.0, the regression results between the variables Lesson Planning (X_1), Implementation (X_2), Assessment (X_3), and the Potential for Differentiated Instruction (Y) are as follows.

Table 1. The results of linear regression analysis model 1 coefficients^a

No.	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant)	.806	.785		.837	.405
	Lesson Planning	.116	.034	.294	3.116	.002
	Implementation	.206	.047	.438	4.223	.001
	Assessment	.803	.078	.637	12.817	.000

From the regression results, we can formulate the equation as follows.

$$Y_1 = 0,294 X_1 + 0,438 X_2 + 0,637 X_3$$

The regression equation holds the following meanings.

- a) The regression coefficients of the three independent variables (Lesson Planning (X_1), Implementation (X_2), Learning Assessment



(X₃) have a positive and significant impact on the dependent variable (Potential for Differentiated Instruction (Y)). This means that if the variables Lesson Planning (X₁), Implementation (X₂), and Learning Assessment (X₃) are very easily implemented or performed, then the Potential for Differentiated Instruction (Y) is also high.

- b) The obtained regression coefficients show that the variables Implementation (X₂) and Learning Assessment (X₃) ($b_2 = 0.438$ and $b_3 = 0.673$) are the dominant variables influencing the high potential for implementing differentiated instruction.

2) Multiple Linear Regression Analysis of Differentiated Instruction Elements

Based on the analysis results using SPSS version 19.0, the regression results between the variables Content/ Materials (X₄), Process/ Teaching Method/ Strategy (X₅), Learning Outcomes/Achievements (X₆), Learning Environment (X₇), and the Potential for Differentiated Instruction (Y) are as follows.

Table 2. The results of linear regression analysis model 1 coefficients^a

No.	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant)	.817	.763		.863	.513
	Content/ Materials	.106	.043	.337	4.216	.003
	Process/Teaching Methods/ Strategies	.765	.089	.764	10.223	.001
	Learning Outcomes/Achievements	.553	.081	.629	9.817	.002
	Learning Environment	.433	.052	.420	6.115	.000

From the regression results, we can formulate the equation as follows.

$$Y_1 = 0,337 X_4 + 0,764 X_5 + 0,629 X_6 + 0,420 X_7$$

The regression equation holds the following meanings.

- a) The regression coefficients of the four independent variables (Content/ Materials (X_4), Process/ Teaching Method/ Strategy (X_5), Learning Outcomes/ Achievements (X_6), Learning Environment (X_7)) have a positive and significant impact on the dependent variable (Potential for Differentiated Instruction (Y)). This means that if the variables Content/Materials (X_4), Process/ Teaching Method/ Strategy (X_5), Learning Outcomes/ Achievements (X_6), and Learning Environment (X_7) are very easily implemented or performed, then the Potential for Differentiated Instruction (Y) is also high.
- b) The obtained regression coefficients show that the variables Process/ Teaching Method/ Strategy (X_5) and Learning Outcomes/ Achievements (X_6) ($b_2 = 0.764$ and $b_3 = 0.629$) are the dominant variables influencing the high potential for differentiated instruction.

b. Model testing

1) F-Test

The F-test is used to examine the simultaneous influence of independent variables on the dependent variable. If the calculated F-value is greater than the critical F-value from the table, then the model used is considered a good fit. The calculated F-value can be found in the regression results, and the F-table is determined using a significance level of $\alpha = 0.05$, with degrees of freedom (df) $df_1 = k - 1$ and $df_2 = n - k$, where k is the number of independent variables and n is the sample size.

a) The Results of the F-test for Linear Regression of Differentiated Instruction Components

The results of the F-test between the variables Lesson Planning (X_1), Implementation (X_2), Learning Assessment (X_3), and the Potential for Differentiated Instruction (Y) are as follows.



Table 3. The *f*-test for linear regression of differentiated instruction components ANOVA

No.	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	474.102	3	168.173	87.028	.000 ^a
	Residual	201.024	95	3.193		
	Total	675.126	96			

a. Predictors: (Constant) Lesson Planning (X1), Implementation (X2), Learning Assessment (X3)

b. Dependent Variable: Potential for Differentiated Instruction (Y)

Table 3 shows a calculated F-value of 87.028, while the F-table with $df1 = 2 - 1 = 1$ and $df2 = 110 - 2 = 108$ is 3.94. Since the calculated F-value is greater than the F-table, the regression model between Lesson Planning (X₁), Implementation (X₂), Learning Assessment (X₃), and the Potential for Differentiated Instruction (Y) is considered a good fit or suitable.

b) The results of the F-test for Linear Regression of Differentiated Instruction Elements

The results of the F-test between the variables Content/ Materials (X₄), Process/ Teaching Method/Strategy (X₅), Learning Outcomes/ Achievements (X₆), Learning Environment (X₇), and the Potential for Differentiated Instruction (Y) are as follows.

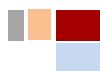
Table 4. F-Test for linear regression model 2 ANOVA_b

No.	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	478.810	4	167.360	115.911	.000 ^a
	Residual	117.210	96	1.393		
	Total	595.390	99			

a. Predictors: (Constant), Content/Materials (X4), Process/ Methods/ Teaching Strategy (X5), Learning Outcomes/ Achievements (X6), Learning Environment (X7)

b. Dependent Variable: Potential for Differentiated Instruction (Y)

Table 4 shows a calculated F-value of 115.911, while the F-table with $df1 = 5 - 1 = 4$ and $df2 = 110 - 4 = 106$ is 3.09. Since the calculated F-value is greater than the F-table, the regression model between Content/ Materials (X₄), Process/ Methods/ Teaching Strategies (X₅), Learning Outcomes/ Achievements (X₆), Learning Environment (X₇), and the Potential for Differentiated Instruction (Y) is considered a good fit or suitable.



2) Coefficient of Determination

The coefficient of determination is used to assess the ability of independent variables to explain the dependent variable. When the Adjusted R-squared value approaches one, it indicates that the independent variables provide nearly all the information needed to predict the variation in the dependent variable.

The results of the coefficient of determination between Lesson Planning (X_1), Implementation (X_2), Learning Assessment (X_3), Content/ Instructional Material (X_4), Process/ Teaching Methods/ Strategy (X_5), Learning Outcomes/Achievement (X_6), Learning Environment (X_7), and the Potential for Differentiated Instruction (Y) can be observed in the following table.

Table 5. Coefficient of determination in linear regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813 ^a	.576	.718	1.456676

Predictors: (Constant), Lesson Planning (X1), Implementation (X2), assessment (X3), Content/Materials (X4), Process/Methods/Teaching Strategy (X5), Learning Outcomes/Achievements (X6), Learning Environment (X7)

The adjusted R-squared value of 0.718 means that Lesson Planning (X_1), Implementation (X_2), Assessment (X_3), Content/ Materials (X_4), Process/ Methods/ Strategies (X_5), Learning Outcomes/ Achievement (X_6), Learning Environment (X_7) can collectively explain 71.8% of the variation in the Potential for Differentiated Instruction (Y). The remaining 28.2% (100% - 71.8%) of the variation is not explained by these independent variables.

c. Hypothesis testing (t-test)

Hypothesis testing for the hypotheses proposed in this study will be conducted based on the results of partial testing using the t-test. The t-test is used to determine the significant influence of independent variables on the dependent variable on a partial basis. If the calculated t-value is greater than the critical t-value from the table, it indicates the acceptance of the



proposed hypotheses or that the variable has a significant influence. The calculated t-value can be found in the regression results, and the t-table is obtained using a significance level of $\alpha = 0.05$ with degrees of freedom (df) equal to $n - k$.

Based on Tables 3 and 4 above, the results of hypothesis testing can be presented in the following table.

Table 6. The results of the t-test

No.	Variables	Influence Weight		Significance $\alpha = 0,05$			Remarks	
		t _{value}	>/<	t _{table}	P value	>/<		Sig.
1.	Lesson Planning (X ₁)	3.116	>	1,985	0,002	<	0,05	Significant Influence
2.	Implementation (X ₂)	4.223	>	1,985	0,001	<	0,05	Significant Influence
3.	Assessment (X ₃)	12.817	>	1,985	0,000	<	0,05	Significant Influence-Dominant
4.	Content/ Materials (X ₄)	4.216	>	1,985	0,003	<	0,05	Significant Influence
5.	Process/ Methods/ Teaching Strategy (X ₅)	10.223	>	1,985	0,001	<	0,05	Significant Influence-Dominant
6.	Learning Outcomes/ Achievements (X ₆)	9.817	>	1,985	0,002	<	0,05	Significant Influence-Dominant
7.	Learning Environment (X ₇)	6.115	>	1,985	0,000	<	0,05	Significant Influence

Based on the table above (Table 4.6), all variables, namely: Lesson Planning (X₁), Implementation (X₂), Assessment (X₃), Content/ Materials (X₄), Process/ Method/ Teaching Strategy (X₅), Learning Outcomes/ Achievements (X₆), and Learning Environment (X₇), have a significant influence on the variable Potential for Differentiated Learning Implementation (Y). Among all these variables, three of them dominantly and significantly influence the Potential for Differentiated Instruction Implementation (Y). These three dominant variables are Assessment (X₃), Process/ Teaching Method/ Strategy (X₅), and Learning Outcomes/ Achievements (X₆).



d. Intervening testing

To test the influence of intervening variables in this research, the path analysis method was used, which is an extension of multiple regression analysis. Path analysis involves the use of regression analysis to estimate the causality relationships among variables established based on theory. Causality relationships among variables have been formed with a model based on theoretical foundations and can be examined using path analysis to discover patterns of relationships among three or more variables (Ghozali, 2012).

A direct relationship occurs when one variable influences another without the presence of a third variable that intervenes. An indirect relationship occurs when there is a third variable that mediates the relationship between the two variables by determining the product of the standardized values of the independent variable on the mediating variable and the mediating variable on the dependent variable. If the path coefficient from the indirect calculation is greater than the direct calculation, it can be concluded that the intervening variable can explain the dependent variable, indicating that mediation exists, and vice versa.

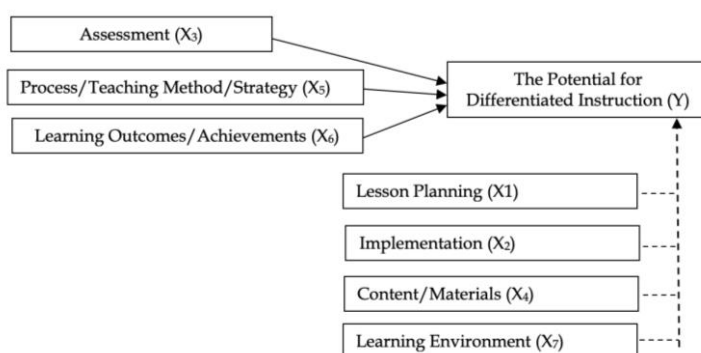


Figure 1. Path analysis model

Based on the path analysis results in Figure 4.1. above, it can be concluded that Assessment (X_3), Process/ Teaching Method/ Strategy (X_5), and Learning Outcomes/ Achievements (X_6) have a significant direct influence on the variable Potential for Differentiated Instruction (Y), while



the variables Lesson Planning (X_1), Implementation (X_2), Content/Materials (X_4), and Learning Environment (X_7) act as intervening variables affecting the magnitude of the Potential for Differentiated Instruction (Y).

2. Discussion

The findings of this research specifically reveal a direct influence of the learning components (particularly the learning assessment variable) and the learning elements (mainly the process/ strategy and learning outcome/ achievement variables) on the potential implementation of differentiated instruction in primary and secondary education. The importance of the assessment role in differentiated instruction can be recognized from the initial assessment, which serves as the gateway for teachers to identify students' readiness, interests, and learning styles. Additionally, the significance of the differentiation element in the process/ strategy implies that teachers need to optimize the differentiation of the process to ensure students receive learning services according to their readiness, interests, and learning styles.

Similarly, the importance of differentiated learning outcomes/ achievements suggests that the dimensions and characteristics of student learning outcomes should not be singular but need to incorporate other dimensions applied by teachers according to student's readiness, interests, and learning styles. This aligns with Abubakar, et al., (2022), who explains that the value and meaningfulness of learning outcomes need to be aligned with local strengths and the characteristics of the local community, such as the local strengths and character of the Aceh community.

Referring to the outcomes of this research, the principle of 'teaching at the right level' in differentiated instruction, particularly within the implementation of the Merdeka Curriculum, truly requires comprehensive understanding and application by educators in primary and secondary education. To ensure learning aligns with the diverse needs, interests, and readiness of students, teachers make specific adjustments in various curriculum and instructional aspects. This corresponds with Ananda (2021),

who explains that within curriculum implementation, there are differences in the application of learning outcome assessments, especially regarding assessment systems and instruments.

As explained by Mavidou and Kakana (2019), differentiated instruction is an approach that requires adequate adjustment of several curriculum aspects to meet the needs and readiness of students, thus achieving learning objectives effectively. Lavania and Nor (2021), also emphasizes that in the implementation of differentiated instruction, teachers need to consider aspects related to curriculum, instruction, differentiated instruction knowledge, school, students, time, and workload.

Differentiated instruction in primary and secondary education within the implementation of the Merdeka Curriculum varies in terms of its learning components and elements (Rosidah, 2024; (Wardani et al., 2023). There is a crucial aspect related to the implementation of differentiated instruction in the Merdeka Curriculum, which is that subject teachers have not fully understood the essence of initial assessment as part of the formative assessment function, and it serves as the gateway to implementing differentiated instruction. Teachers also lack an understanding of what readiness to learn, interest in learning, and learning styles of students mean as dimensions of differentiation (Wardiyah et al., 2023; Susdamayanti, 2024; Inayatillah et al., 2022).

Therefore, an initial assessment is needed, and its results will serve as a reference for teachers in facilitating the learning process. In other words, teachers have not yet grasped that the initial assessment measures the dimension of differences in readiness to learn (which is cognitive), measures interest in learning (diagnostic), or learning styles (diagnostic). This situation is in line with the conclusion of Ismajli and Morina (2018), which states that teachers' understanding and ability to implement differentiated learning are not yet adequate, and in practice, teachers tend to focus more on the product while neglecting the content and learning process.

The curriculums aspects that teachers need to consider in differentiated instruction are related to two main aspects: the components



of instruction (planning, implementation, and assessment) and the elements of instruction (content, process, outcomes/ achievements, and the learning environment). The effectiveness of differentiated instruction in achieving its goals is closely tied to teachers' understanding of these two main aspects. However, the reality in the field is that many teachers still have misconceptions about differentiated learning. Adare, et al., (2023) explain that there is a problem with conceptual understanding of differentiated learning among teachers, as well as differences in understanding of differentiated learning between language teachers and teachers of other science subjects, and a lack of professional training related to differentiated instruction.

Putra (2023) further elaborates that most research findings indicate misconceptions among teachers, not only in the practice of differentiation but also due to low self-efficacy and motivation among teachers. Moreover, Putra (2023) explains that we need to overcome these barriers because teachers' misunderstandings pose a significant obstacle to implementing differentiated instruction in the classroom. Teachers' awareness of applying different learning approaches will influence students' learning outcomes.

One of the variables that significantly influence differentiated instruction is the teacher's ability to plan and implement various assessment strategies accurately. Elmer (2022) revealed that students have a positive perception of using different assessments in differentiated instruction. This also significantly improves students' performance based on measurements before and after learning. Westbroek, et al., (2020) explains that assessment in differentiated instruction focuses on the learning process and has a positive impact on students' learning outcomes. However, assessment in differentiated instruction can be a challenging step for teachers to carry out effectively.

The next dominant variable is the teacher's ability to manage differentiation in the learning process and apply differentiation to the criteria for learning outcomes/ achievements. Both of these variables are part of the teacher's ability to facilitate differentiated instruction. In this context, Mavidou and Kakana (2019), emphasize the need for an



appropriate and effective teacher professional development program to gain a clear understanding of the concept of differentiated instruction and successfully facilitate its implementation. Through professional development training, effective support will be provided to teachers to change their perceptions and teaching practices, enabling them to implement differentiated instruction successfully. This aligns with Ginja & Chen (2020), who point out that inhibiting factors for the implementation of differentiated instruction include a limited number of trained teachers, misconceptions about differentiated learning, large class sizes, limited access to teacher professional development training, and insufficient learning facilities.

D. Conclusion

The research findings indicate three variables within the learning component and learning elements significantly influencing the potential for differentiated instruction (Y): learning assessment (X_3) with a t_{value} of 12.817 > t_{table} 1.985; learning process (X_5) with a t -value of 10.223 > t -table 1.985, and learning outcomes (X_6) with a t_{value} of 9.817 > t_{table} 1.985. Based on these results, it can be concluded that there are at least three aspects that teachers need to focus on to optimize the implementation of differentiated learning.

Firstly, the precise application of learning assessment, especially initial assessments serves as the gateway for teachers to recognize students' readiness, interests, and learning styles. Secondly, differentiating the learning process/ strategies to create a dynamic classroom atmosphere aligned with students' readiness, interests, and learning styles. Lastly, diversifying learning outcomes/ achievements, and ensuring students' learning achievements encompass multiple dimensions that consider their readiness, interests, and learning styles.

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