

The influence of teachers' pedagogical competence on the implementation of differentiated instruction at Muhammadiyah Senior High School Imogiri

by

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<p>Article History Submitted: 3 July 2025 Revised : 4 September 2025 Accepted : 8 September 2025</p> <p>Keywords: <i>pedagogical competence; differentiated learning.</i></p>	<p>Abstract</p> <p><i>This research is motivated by the implementation of the Independent Curriculum, which requires the creation of a flexible and student-centered learning approach. Teacher competence in carrying out differentiated learning is an important component for achieving a maximum educational process. This research seeks to examine the extent to which teachers' pedagogical competence affects the application of differentiated instruction at Muhammadiyah Senior High School Imogiri. This research employs a descriptive quantitative approach. The data were analyzed using several techniques, including tests for validity, reliability, and normality, as well as simple linear correlation and regression analysis. The subjects in this study amounted to 22 teachers, with the main instrument in the form of questionnaires. The findings indicate that teachers' pedagogical competence exerts a positive and significant impact on the implementation of differentiated instruction at SMA Muhammadiyah Imogiri. This is supported by the regression analysis results, which indicate that teachers' pedagogical competence accounts for 54.4% of the effectiveness in implementing differentiated learning. These findings also show that aspects such as understanding student characteristics, selecting appropriate learning methods, and being able to design adaptive learning are important factors. Teachers with higher levels of pedagogic competence tend to be able to build a responsive, inclusive, and student-oriented learning environment. Therefore, enhancing pedagogical competence is a strategic effort to support the successful enactment of the Independent Curriculum within schools.</i></p>
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Introduction

Education is essentially a planned effort to develop human potential, both in terms of knowledge, skills, and attitudes, so that they can play an optimal role

in personal, social, and professional life. In its journey, education is not only understood as a process of knowledge transfer, but also as a means of character formation and empowerment of individuals to be able to face the challenges of the changing times (Rahmawati, 2023). The increasingly complex condition of society requires the world of education to be adaptive, so the learning approach cannot be uniform. Each student has different backgrounds, abilities, and learning needs, so the education system is required to present a learning strategy that is responsive to this diversity (Nuriyah et al., 2024). Therefore, the current education policy emphasizes the importance of differentiation in learning, which is an approach that provides space for each student to develop according to their own unique potential.

The development of the world of education today demands a more inclusive and student-centered learning approach. Inclusive education plays a role in accommodating the learning needs of all students without discrimination, whether students have special needs or not (Sahrudin et al., 2023). Inclusive education plays a vital role in providing fair access to quality learning experiences for every student, regardless of their background or abilities, without exception, so that they can develop their respective potentials and abilities (Thana and Hanipah, 2023). Basically, each student is a unique individual and is different from one another (Andajani, 2022) This difference needs to be an important concern in order to achieve a fair learning process.

One approach to responding to inclusive education is differentiated learning. Differentiated learning functions to accommodate the needs of students, serve and recognize the diversity of students in the learning process in accordance with students' readiness, interests, and learning preferences (Wulandari, 2022). Differentiated instruction aims to tailor classroom learning experiences to accommodate students' needs by relying on a series of well-considered decisions made by the teacher (Nurdini, 2021). Teachers are responsible for ensuring that classroom instruction is aligned with students' abilities, needs, and interests. This

alignment helps prevent students from experiencing discouragement or perceiving themselves as unsuccessful during learning activities (Wahyuningsari et al. 2022).

The effectiveness of differentiated learning implementation is largely determined by the teacher's central role as the primary driver of the instructional process. The learning process follows a continuous sequence, beginning with the formulation of competency goals, progressing through instructional design, and incorporating assessment strategies to support students in achieving the desired learning outcomes (Kemdikbud, 2022). The competencies in question are the 4Cs (communication, collaboration, critical and creative). In order to create quality education, teachers and students must both understand the importance of the 4C competencies (Susanti and Arista 2019). Applying differentiated instruction aligned with 4C competencies contributes not only to enhancing instructional effectiveness in the classroom but also equips students to become adaptable and competitive individuals in the future.

Implementing differentiated instruction goes beyond merely categorizing students by achievement levels; it aims to ensure that every learner is given the chance to engage in learning based on their individual capacities (Pitaloka & Arsanti, 2022). It is important for educators to recognize the characteristics of students in order to be a reference in formulating the right learning strategies (Septianti & Afiani, 2020). In addition, differentiated learning emphasizes the suitability of methods, materials, and evaluations so that all students can learn optimally according to their style and needs. The effective use of differentiated learning to improve student learning outcomes (Rachmadhani & Kamalia, 2023). Ultimately, differentiated learning helps teachers create a more responsive classroom atmosphere by presenting media-based learning, such as images, videos and objects around (Muslimin et al., 2022).

Based on Law Number 14 of 2005 concerning Teachers and Lecturers, teacher competence plays a crucial role in the success of instructional practices, including the implementation of differentiated learning. The effectiveness of such

learning depends on the teacher's ability to understand and respond to the diverse characteristics and needs of students. The competencies required include pedagogical, personal, social, and professional competence, all of which are fundamental for teachers to create meaningful and responsive learning experiences. Mastering these four competencies is essential for facilitating effective instruction, as it directly influences how teachers design and implement learning experiences that contribute to the holistic development of students. Pedagogical competence is one of the essential qualifications teachers must possess to effectively implement differentiated instruction (Nellitawati, 2019). The pedagogical competence mastered by teachers is the key to the success of a defense process (Bukit & Tarigan, 2022)

Pedagogical competence is commonly understood as the educator's capacity to design, organize, and facilitate effective instructional activities within the classroom setting (Jannah, 2020) These abilities include the process of designing, implementing, and evaluating effective learning for each student (Wahyuni & Berliani, 2018) Teachers with good pedagogic competence will be able to identify differences in students' abilities, interests, and learning styles, so that they can create the right learning strategies. If teachers do not master pedagogic competence, it can cause boredom in students so that learning runs not optimally (Octavianingrum, 2020) Meanwhile, in differentiated learning, it tests heterogeneous classroom management skills and creates a supportive learning atmosphere for all students. Teachers are required to determine relevant approaches, appropriate strategies and methods, as well as learning techniques that are in accordance with the characteristics of students and increase student learning (Wau, 2020)

The ability to implement varied learning strategies, the use of appropriate learning media, and the ability to conduct accurate evaluations of student development are indispensable in the learning process. Applying well-structured and suitable instructional approaches can enhance students' ability to grasp the

concepts being taught. When strategies are aligned with learning processes, content, and expected outcomes, they can encourage greater student engagement in classroom activities, ultimately contributing to improved academic performance (Fitra, 2022). Teachers with strong pedagogic competence can understand differentiated learning in its entirety, so that the quality of learning can maximize students' academic achievement and also form a positive attitude towards learning. Therefore, the higher the level of pedagogic ability that teachers have, the greater the opportunity for students to achieve optimal learning outcomes.

Pedagogical competence, especially in differentiated learning, teachers are not only required to recognize the differences of students, but also to be able to design learning that pays attention to three main dimensions, namely content, processes, and products. Content differentiation means that teachers adjust teaching materials to suit students' readiness and interest levels (Atikah et al., 2023). Process differentiation refers to the variation in the way learning is delivered, such as through group discussions, projects, or the use of diverse digital media (Utaminingsyas & Kholim, 2024). Meanwhile, product differentiation gives students the opportunity to express their understanding in different ways, for example through presentations, written reports, or creative works (L. Lestari et al., 2023). Finally, differentiation of learning environments emphasizes the creation of a classroom atmosphere that is inclusive, flexible, and supportive of different learning styles. These four dimensions are an important foundation for teachers in applying pedagogical competencies more comprehensively, so that each student can get an optimal learning experience according to their respective potential.

Muhammadiyah Imogiri High School, as one of the educational institutions in Bantul Regency, has implemented the Independent Curriculum for two years. SMA Muhammadiyah Imogiri consistently supports its teachers in implementing instructional strategies that are tailored to accommodate students' diverse needs. Schools have made efforts to improve teachers' comprehension of differentiated instruction through the organization of various workshops and professional

development programs. Based on initial observations and the results of reflection in schools, it was found that there were variations in the implementation of differentiated learning by teachers. Some teachers have superior abilities in integrating differentiated strategies in the learning process, while others still encounter obstacles/difficulties in implementing learning methods that suit the needs of students. This condition raises the question of teachers' success in implementing differentiated learning. One of them is pedagogical competence.

This research aims to explore how teachers' pedagogical competence supports the application of instructional strategies that address the varying needs of students. The central research question is: To what extent does pedagogical competence affect the implementation of differentiated learning at SMA Muhammadiyah Imogiri? The findings are expected to offer both theoretical insights and practical relevance, particularly in guiding efforts to enhance teacher professional development within the school. A clearer understanding of the role pedagogical competence plays in differentiated instruction can help schools strengthen instructional quality and contribute to broader improvements in educational outcomes

Method

This study uses a quantitative methodology to explore the influence of teachers' pedagogical competence on the application of different instructional practices. The research population consists of all teaching staff at SMA Muhammadiyah Imogiri. The research sample was taken purposively with a limited number, so the results of this study have limitations in terms of generalization to a wider population.

Data were collected using a structured questionnaire containing the items of instruments that have been developed based on a literature review and theories related to pedagogical competence and learning practices. The instrument items include aspects such as learning management, evaluation techniques, variations in

teaching methods, and the use of learning media. Before use, the questionnaire was tested for validity and reliability using Cronbach's Alpha coefficient, with a value above 0.70 as the minimum limit of accepted reliability.

Data analysis was carried out with descriptive statistics to describe the characteristics of teachers' pedagogical competence and the level of implementation of learning practices. In addition, simple linear regression analysis is used to test the influence of pedagogical competence on instructional practices applied by teachers. With this improvement, the research is expected to provide a more comprehensive picture of the relationship between pedagogical competence and learning practices at SMA Muhammadiyah Imogiri, with recognition of the limitations of generalization due to the limited sample.

Result and Discussion

The author should explain the results of research (what was discovered) in detail. The research result and discussion section contain results of the research findings and their ensuing discussions. The findings acquired from the results of the conducted research should be written with the supplementary support of adequate data. The research results and findings should be able to resolve or provide explanations to the question stated in the introduction and also contains with the author's analysis of the findings by connecting the empirical data with the theory used.

This section presents the results of research obtained from statistical analysis related to the influence of teachers' pedagogic competence on the implementation of differentiated learning at SMA Muhammadiyah Imogiri. Data analysis includes statistical description, instrument validity and reliability test, data normality test, correlation analysis, and linear regression analysis. Based on the results of descriptive statistical analysis conducted on teacher pedagogic competency data and the implementation of differentiated learning, the following information was obtained:

Table 1. Description of Pedagogic Competency Data and Implementation of Differentiated Learning

	N	Min	Max	Mean	Std. Deviation
Teacher's Pedagogic Competence	22	42	55	49.41	3.750
Implementation of Differentiated Learning	22	67	80	74.09	3.146
Valid (listwise)	22				

The variables of teacher pedagogic competence showed that the minimum score was 42, the maximum score was 55, the average (mean) was 49.41, and the standard deviation was 3,750. Meanwhile, for the differentiated learning implementation variable, the minimum score was 67, the maximum score was 80, the mean was 74.09, and the standard deviation was 3,146. From the data table 1, it can be concluded that overall, the data show that teachers' pedagogic competence and differentiated learning implementation are at a good level, although there are slight differences among respondents.

Furthermore, to ensure that the instruments used can accurately measure teachers' pedagogic competence and the implementation of differentiated learning, validity and reliability tests are carried out. The value of the validity coefficient of the pedagogic competency instrument was 0.71, while the differentiated learning implementation instrument had a validity coefficient of 0.84. Both values are greater than the minimum limit of 0.6, so the instrument is declared valid. Based on the results of the validity test, it shows that the questions in the questionnaire accurately measure the pedagogic competence of teachers and the implementation of differentiated learning at SMA Muhamamdiyah Imogiri.

Following the validity test, a normality test was conducted to determine whether the residual values were normally distributed. The Kolmogorov-Smirnov test was employed to assess the normality of the data.

Table 2. Data Normality Test

N		22
Normal Parameters ^{a,b}	Mean	.0000
	Std. Deviation	2.12382378
Most Extreme Differences	Absolute	.138
	Positive	.083
	Negatif	-.138
Test Statistic		.138
Asymp. Sig. (2-tailed)		.200

According to the normality test results shown in Table 2, the data yielded a significance value of 0.200, which is above the acceptable limit of 0.05. This indicates that the distribution of the data meets the assumptions of normality, allowing for the use of correlation and linear regression techniques. To evaluate the nature and degree of association between the variables, a correlation test was performed. As reported in Table 3, the findings reveal a significant and positive relationship between teachers' pedagogical competence and their implementation of differentiated learning practices.

Table 3. Correlation Analysis

		Competence in Education	Implementation of Differentiated Learning
Competence in Education	Pearson	1	.738**
	Correlation		
	Sig. (2-tailed)		.000
Implementation of Differentiated Learning	N	22	22
	Pearson	.738	1
	Correlation		
	Sig. (2-tailed)	.000	
		N	22

Table 3 shows that there is a correlation coefficient of 0.738 and a significance level of 0.000 ($p < 0.05$). This shows that the higher the pedagogic competence that teachers have, the higher the level of implementation of differentiated learning that they do.

After establishing that a significant positive correlation exists between teachers' pedagogical competence and the application of differentiated instruction, a simple linear regression analysis was carried out to measure the degree of influence one variable has on the other. The outcomes of this analysis are detailed in Table 4.

Table 4. Linear Regression Analysis

Model R		R Square	Adjusted R Square	Std. Error of the Estimate	
1	.738*	.544	.521	2.176	

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	113.095	1	113.095	23.879	.000 ^b
	Residual	95.723	20	4.736		
	Total	207.818	21			

Based on the data presented in Table 4, the F-value is 23 with a significance level of 0.000, which is below the 0.05 threshold. This indicates a statistically significant influence of teachers' pedagogical competence on the variability of differentiated learning implementation at SMA Muhammadiyah Imogiri. The correlation coefficient (R) is 0.738, suggesting a strong positive relationship between the two variables. Furthermore, the coefficient of determination (R^2) is 0.544, indicating that 54.4% of the variation in the implementation of differentiated learning can be explained by teachers' pedagogical competence.

Pedagogical competence refers to the ability of teachers to understand student characteristics, plan and deliver effective teaching, assess learning outcomes, and encourage the development of diverse student potentials (P. Lestari et al., 2023). The importance of teachers understanding student characteristics in depth to create a supportive and productive learning environment (Rafidah & Purnomo, 2025). Pedagogical competence is an important skill that teachers must possess to ensure that the learning process is carried out effectively (Hamdi et al.,

2022). Mastering pedagogical competencies well will increase the chances of creating effective and meaningful learning. Teachers who have strong pedagogical competence are able to create a conducive learning environment that supports students' intellectual, emotional, and social development. The instructional process can then be adjusted by using methods and strategies that are aligned with the diverse needs and characteristics of students.

The findings show that teachers' pedagogical competence plays an important role in shaping the effectiveness of different teaching at SMA Muhammadiyah Imogiri. These findings suggest that teachers who have strong pedagogical competencies are more likely to design and deliver instruction that aligns with each student's unique learning requirements. Some aspects of pedagogical competence that play an important role include understanding of student characteristics, the ability to design flexible learning, and the ability to modify teaching strategies to meet diverse needs in the classroom.

The results of this study reinforce the idea that pedagogical competence is a key component in facilitating the successful implementation of differentiated teaching within the framework of the Independent Curriculum. Using different learning strategies has been shown to effectively improve students' understanding of targeted learning indicators. Different teaching is often considered more engaging than traditional teaching approaches, as it emphasizes the various needs and preferences of learners, thereby increasing their interest and motivation in the learning process (Aprima & Sari, 2022).

The findings of the study revealed that pedagogical competence among teachers significantly affects the extent to which differentiated teaching is applied. This means that by having good pedagogical competence, teachers have the potential to be able to create a learning process that is responsive to students' learning needs, especially prioritizing a flexible and student-centered approach. This is in line with different teaching principles, which emphasize the use of diverse content, methods, and strategies tailored to the individual characteristics of

students. The main goal is to allow learners to engage with the material in a way that reflects their unique interests, strengths, and capacities (Rosyah & Darmawan, 2023). Thus, a good mastery of pedagogic competence can be a strong basis for teachers to develop appropriate learning strategies in accordance with the diversity of students' learning styles, interests, and academic abilities.

Furthermore, when viewed from the determination coefficient (R Square) of 0.544, this shows that more than half of the differentiated variation in learning implementation can be explained by the teacher's pedagogic competency variable. The results not only demonstrate statistical validity but also carry meaningful implications for real-world educational practices. This reflects that teachers who have a good understanding of pedagogical aspects such as initial diagnostic assessments, adaptive learning design, and customization of learning processes and products will be better prepared to deal with the complexity of student learning needs in diverse classrooms.

The results of the above study also show that teachers who have high pedagogical competence are more consistent in implementing differentiation strategies. To understand it more deeply, the implementation can be explained through four dimensions of differentiation, namely content, process, product, and learning environment.

First, content differentiation. The teacher adjusts the depth of the material to the readiness and ability of the students. In Mathematics learning, for example, students with low basic understanding are given multi-level problem practice from simple to complex, while students with higher abilities are directed to problems that require advanced reasoning and problem-solving. This strategy prevents students from feeling overwhelmed or overwhelmed, while ensuring that all students remain challenged at the appropriate level.

Second, process differentiation. Teachers vary the way material is delivered so that all students can be actively involved according to their learning style. In science learning, teachers not only convey concepts through lectures, but also

invite students to conduct simple experiments in the laboratory, group discussions to practice collaboration, and the use of visual media such as simulation videos or infographics. This approach gives students with visual, auditory, and kinesthetic tendencies the opportunity to learn in the way that is most effective for them.

Third, product differentiation. Teachers give flexibility to students in expressing understanding. In Indonesian lessons, for example, some students choose to create analytical essays to show in-depth understanding, while others can present learning results in the form of oral presentations, posters, or creative works such as poems. This freedom not only increases motivation, but also provides space for students to demonstrate their unique competencies according to their interests and talents.

Fourth, differentiation of the learning environment. Teachers create a flexible, inclusive, and welcoming classroom atmosphere for all students. The classroom layout is arranged to allow for group work and individual learning. Teachers also provide a reading corner or independent exploration space, as well as build open communication so that students feel safe to ask questions and express opinions. Such a learning environment encourages more equitable participation and strengthens the sense of togetherness between students.

These four dimensions show that differentiation is not only an abstract concept, but also visible in the daily practice of teachers. These findings confirm the quantitative results of the research that good pedagogical competence is not only related to the understanding of learning theory, but is manifested in adaptive strategies that include content, processes, products, and learning environments. Thus, learning can take place more meaningfully, participatory, and in accordance with each student's unique potential.

These findings also highlight the urgency of a reflective approach in teachers' professional practice. Teachers need to continually evaluate the strategies they use in learning as well as analyze the extent to which these approaches affect the success of individual students. In the context of the Independent Curriculum

that emphasizes flexibility and autonomy of learning, pedagogic competence is not only normative, but must be actualized in the form of concrete instructional differentiation skills oriented towards meaningful learning.

On the other hand, the fact that pedagogic competencies explain only 54.4% of the variation in different learning implementations also opens up opportunities to explore other factors that play an important role, such as school management support, principals' instructional leadership, access to learning resources, and teachers' intrinsic motivation to innovate. This can be a recommendation material for further research using a blended approach in order to gain a more complete understanding of the dynamics of differentiated learning implementation in schools.

The results of this study highlight that improving pedagogical competence is the main strategy in advancing the quality of education as a whole. From a practical point of view, educational institutions can organize professional training programs and workshops aimed at strengthening teachers' pedagogical competence. The results of multi-level training and workshops have been proven to improve teachers' pedagogic competence and improve teachers' performance in implementing innovative learning models during learning (Utiahman, 2020) By improving pedagogic competence, it is hoped that teachers can create a more meaningful learning experience and grow students' potential to the maximum.

Some of the findings from this study are consistent with previous research, which shows that pedagogical competence is strongly related to teachers' ability to implement flexible and innovative instructional strategies. Research conducted by Elinda, et al. (2022), states that one of the main competencies that must be improved in the field of education is pedagogical competence, which refers to the ability of teachers to manage the student learning process effectively. Pedagogical competence is considered a core professional skill that teachers must develop to improve the learning process and student outcomes. This research highlights key components of pedagogical competence, including mastery of learning theory,

effective communication with students, and the ability to conduct meaningful learning evaluations. The obstacle faced in improving teachers' pedagogic competence is the low ability of teachers to master ICT.

Another study was also conducted by Akbar (2021) This study supports previous research that showed the relationship between pedagogical competence and the use of different instructional practices. The results emphasize that educators who have higher levels of pedagogical expertise tend to be more effective in modifying their teaching approaches to meet the varied learning needs of students. These findings suggest that improving pedagogical competence is essential for the successful implementation of different learning strategies. Choosing the right approaches in the instructional process can significantly improve student learning outcomes. By considering learning profiles, interests, and learning styles, educators can design effective and engaging learning experiences that foster increased student motivation and interest in learning (Firmansyah et al., 2023).

Improving teachers' pedagogic competence cannot be done instantly. A continuous and tiered process is needed so that teachers are able to master various innovative learning models optimally. Participating in training programs, workshops, and seminars can be an effective way to facilitate teachers to learn and share experiences with peers. Teachers can obtain a wide range of information about various strategies and best practices in the learning process according to the needs of students. In addition, support from schools and the surrounding environment is needed to provide adequate resources. By providing support and opportunities for teachers to continue to develop their skills, different learning implementations can be created effectively.

This research certainly has some limitations that still need to be improved. The selection of quantitative methods in this study does not to be able to explain the process of implementing deeply differentiated learning. In addition, this research was conducted in only one school, so the generalization of the results

obtained is still limited. Follow-up research is recommended to use mixed methods to get a more comprehensive picture and expand the scope of the research to other schools so that the research results are more representative.

Conclusion

Based on the results of the research, it can be concluded that the pedagogic competence of teachers is the main determinant in the success of the implementation of different learning. These findings empirically prove that the higher the pedagogic competence of teachers, the greater their ability to design, implement, and evaluate adaptive learning according to students' needs, interests, and learning styles.

The contribution of 54.4% shows that improving teachers' pedagogic competence is a strategic priority in efforts to optimize the Independent Curriculum in educational units. In other words, strengthening the pedagogic capacity of teachers is not only an administrative demand, but a real need to realize an inclusive, participatory, and empowering education for each individual student.

Procedurally, the form of differentiation carried out by teachers includes four main dimensions. In the content aspect, teachers adjust the difficulty level of the material according to the readiness of students so that each student can learn at an appropriate level. In the process aspect, teachers use a variety of methods such as group discussions, experiments, and the use of digital media to adjust students' learning styles. In the product aspect, teachers give students the freedom to express their understanding through various forms of works, ranging from essays to creative works. In the aspect of the learning environment, teachers create an inclusive, flexible classroom atmosphere and encourage the active participation of all students.

The practical implication of this research is the importance of schools to systematically develop teacher competency improvement programs, ranging from differentiation strategy training, strengthening formative assessments, to providing a professional learning community between teachers. This development

must also be supported by school policies that support learning innovation and accommodate diversity in the classroom.

These findings underscore the important role of improving pedagogical competence in facilitating the implementation of differentiated learning that is responsive to student needs. Therefore, this research is expected to contribute not only to academic discourse but also to be a strategic reference for school-level and foundation policymakers in their efforts to improve the quality of education by empowering teachers as key agents of change.

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