

Teacher Adaptation in Science Curriculum Development: Enhancing Student Learning Satisfaction

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ABSTRACT

The ability to develop science-based curriculum content is essential to ensuring effective and relevant science education. This study investigates the impact of teacher adaptation in curriculum development on student learning satisfaction. A quantitative approach with a descriptive survey method was employed. The study was conducted at MTsN 1 Bengkulu City, involving 120 students, with a randomly selected sample of 50 eighth-grade students. Data were collected using a Likert-scale questionnaire (1–5). Instrument validity was assessed using the Aiken index, and reliability was determined through Cronbach's alpha. Data were analyzed using a t-test for mean differences, preceded by normality and homogeneity tests. Findings indicate that the average teacher adaptation score was higher than the student learning satisfaction score. Statistical analysis yielded a t-value of 5.473 and a p-value of 0.000 (< 0.05), demonstrating a significant positive effect of teacher adaptation on student learning satisfaction. The results suggest that when teachers effectively adapt curriculum content to meet student needs, learning satisfaction improves. This highlights the importance of teacher training and professional development programs in curriculum design. Teacher adaptation significantly influences student learning satisfaction, underscoring the need for policies supporting teacher training and curriculum development. Future research should explore additional factors influencing student learning outcomes.

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1. INTRODUCTION

The curriculum serves as a framework for implementing education and learning, aimed at achieving the intended educational outcomes. These objectives can be realized if the curriculum incorporates content that aligns with the established goals. In education, the curriculum plays a crucial role (Humaidi, 2014). It consists of plans and structures that include objectives, subject matter, and methods, which guide the learning process to reach specific educational targets (Aprianti & Maulia, 2023). Overall, the curriculum functions as the basis for the educational process, determining both what should be taught and how the material is presented to students.

The content of the curriculum is a crucial component that needs to be thoughtfully developed in order to meet the established educational objectives (Achmad, 2021). A curriculum consists of various plans for student activities, including the materials or content, teaching strategies, the learning environment, and activities designed to accomplish the desired outcomes. According to this perspective, the curriculum comprises four key elements: educational goals, the content delivered, teaching methods, and assessment techniques.

The learning objectives outlined in the curriculum can only be achieved if the curriculum includes materials or teaching resources that are aligned with these objectives, and are accompanied by suitable teaching methods and assessment techniques (Aureza & Ardin, 2021). One key factor contributing to low achievement in science mastery is the competency of science teachers. A survey of science teacher performance conducted by the Center for Education Data and Information of the Ministry of National Education in 2015 revealed that the average performance of science teachers was still below the level considered satisfactory. Curriculum development policies at the school level have undergone significant changes, granting schools more authority to tailor the curriculum to their specific needs. As a result, it is crucial for teachers to have a thorough understanding of the curriculum content before delivering it to students, as this directly influences the learning process and the overall quality of the curriculum implemented.

The development of curriculum content refers to the essential material that forms the foundation of the curriculum, playing a crucial role in achieving educational goals (Azwir Salam, 2024). The content of the science curriculum holds a significant position, serving as a fundamental and inseparable part of the overall science education process. It is important for teachers to comprehend the curriculum, and ideally, everyone involved in the delivery of science education in schools should also have an understanding of the curriculum content within their specific roles. The science curriculum offers a variety of learning experiences aimed at helping students grasp both scientific concepts and processes. This knowledge enables students to address: i) local, national, regional, global, social, economic, environmental, and ethical issues; ii) critically evaluate advancements in science and technology and their impacts; iii) contribute to the sustainable development of science and technology; and iv) make informed career choices. As a result, the science curriculum prioritizes the development of students as true learners, aligning with the goals outlined in the Science Learning Content Standards for junior high schools/Islamic junior high schools.

The curriculum plays a significant role in shaping the experiences of both teachers and students in schools. Teachers, in particular, must undergo an adaptation process when implementing the latest curriculum, which is in line with the guidelines set by the Ministry of Education (Nurrohim, 2020). This adaptation process can vary widely among teachers, especially since this curriculum is the first to offer greater freedom in how learning is conducted in schools. Adaptation itself refers to the process through which individuals strive to achieve balance by fulfilling their needs in response to environmental changes (Utami, 2015). In this context, adaptation involves adjusting to shifts in the educational environment. Teachers, therefore, must adapt to the Independent Curriculum. As educators, they are expected to understand, adjust, and effectively apply the curriculum in developing content based on scientific principles, thereby supporting students in reaching their full learning potential. In this regard, teachers must fulfill both their rights and responsibilities, including adapting when developing science-based curriculum content.

In adapting to the science curriculum, teachers must first comprehend the concept of the curriculum content. They adjust to the curriculum by applying it in accordance with the relevant guidelines, preparing necessary resources, and utilizing various sources such as science content development, diagnostic assessments, and student differentiation (Rahayu et al., 2022). This process involves teachers adapting to multiple systems, including adjustments to the teaching plan and teaching modules, as well as effectively implementing the development of science content. Furthermore, teachers must also adapt to changes in assessment methods.

One way teachers have adapted their approach is through changes in their assessment methods. In the previous curriculum, such as the 2013 Curriculum, assessments focused on three areas: attitude, knowledge, and skills. In contrast, the Independent Curriculum offers a more flexible assessment system that is closely integrated with the learning process. This curriculum allows teachers and schools greater autonomy in choosing the content, teaching methods, and assessments that best match students' characteristics, interests, talents, and needs. Furthermore, the content development in this curriculum prioritizes fostering creativity, innovation, 21st-century skills, and the cultivation of positive student attitudes (Thair & Treagust, 2003).

Based on interviews with several science teachers at MTsN 1 Bengkulu City, it was found that teachers are adjusting to the science curriculum in ways that differ from their usual teaching methods. This is because they need to actively engage students in hands-on learning rather than relying heavily on theoretical instruction. However, the adaptation process is not always smooth, as there are various factors that hinder it. According to research by Aryand et al. (2020), some of the challenges include confusion, interpersonal barriers, difficulties in navigating the adaptation process, and established habits. One of the key obstacles teachers face is a lack of content knowledge, which impacts their ability to effectively implement the science curriculum.

Based on the gathered information, teachers' comprehension of the science curriculum is the primary barrier to effective teaching and learning. In practice, teachers struggle to apply various modern teaching methods, such as diagnostic assessments, where they are unsure how to evaluate students based on their individual characteristics. Additionally, in student-centered and differentiated learning, teachers often face challenges, especially when students change their preferences, leading to confusion during the implementation process.

The success of a school is largely determined by the quality of the services it provides, which can be gauged by student satisfaction with the learning experience. One of the primary objectives for teachers is to achieve student satisfaction in the teaching and learning process, as it plays a crucial role in ensuring effective learning outcomes. To enhance service quality, teachers must first understand students' needs and then ensure that their services align with these expectations, fostering a sense of satisfaction in the learning process (Selman, & Jaedun, 2020). When students are content with their learning activities, they are more likely to be motivated. Key factors that contribute to student satisfaction include the quality of services, the teaching and learning process, and available facilities. By prioritizing student satisfaction, schools can promote more efficient development. The level of satisfaction is often reflected in the gap between students' expectations and their perceived experiences. Students feel satisfied when their expectations are either met or surpassed, which can lead to increased loyalty and better academic outcomes (Karyanto et al., 2021).

A person can fulfill their desires, which is expected to bring a sense of satisfaction with what they have accomplished. This feeling of satisfaction in learning is similar to that experienced by students; when their learning goals align with the expectations of themselves, their parents, schools, and educational objectives, they will feel satisfied with their progress (Nurul, 2020). According to Indriani and Marno (2024), satisfaction is the emotional response a person experiences after comparing their actual achievements with their anticipated expectations.

According to Nurul (2020), learning satisfaction refers to an emotional state that manifests in a positive attitude towards various activities and responses to the external environment. Similarly, Vista and Sabandi (2020) noted that satisfaction encompasses dimensions such as meeting one's expectations, obtaining desired outcomes, and overall contentment. The level of student learning satisfaction reflects the progression and variations in performance over time, which aligns with students' evolving expectations. Octavia (2020) further explained that satisfaction levels typically vary based on performance: if performance falls short of expectations, students feel dissatisfied; if performance meets expectations, students feel satisfied; and if performance exceeds expectations, students experience high satisfaction and happiness. Students' satisfaction is influenced by their expectations of the school, as they believe the institution will fulfill their needs and contribute to their future success. Factors affecting

student satisfaction include the quality of service provided, with students being more likely to feel satisfied when they receive good service, which shapes their overall perception of the school (Maulidina & Bhakti, 2020).

Student satisfaction is a key factor in the success of the learning process managed by teachers and schools, including the provision of learning resources. However, dissatisfaction may occur, often due to a gap between students' expectations and their actual experiences. Students generally feel satisfied when there is alignment between their skills, abilities, and expectations in the learning process. In contrast, dissatisfaction arises when there is a disconnect between these factors. Learning satisfaction can be described as a positive emotional state that manifests as a favorable attitude toward the learning activities aimed at achieving change (Muflihatusun & Suryani, 2020). From this perspective, student learning satisfaction reflects an emotional response to the difference between the actual learning experience and students' expectations, resulting in either enjoyment or disappointment.

According to research conducted by Elpalina et al. (2024), the analysis revealed that, overall, students expressed a high level of satisfaction with various aspects of the Independent Curriculum. These included learning engagement and motivation (average score of 3.76), understanding of the subject matter (average score of 3.50), use of engaging teaching methods (average score of 3.87), and evaluation and assessment systems (average score of 3.58). However, attention is needed in the area of students' social and emotional development, which received a lower score of 2.87, indicating that it remains a less satisfactory aspect. The study concludes that while curriculum changes can enhance student satisfaction in several areas, continuous evaluation is necessary to ensure that the new curriculum provides an optimal learning experience and contributes to the overall improvement of educational quality.

A study by Indriani and Marno in 2024 examined the effects of changes in curriculum policy on teachers. The research highlighted that such changes directly influence teachers' perceptions, teaching methods, and professionalism, while also having indirect effects on job satisfaction and work motivation (Indriani & Marno, 2024). Additionally, other research explored the impact of the 2013 Curriculum revisions on the learning outcomes of class X students at MAN 1 Solok. The findings indicated that the Independent Curriculum positively affected education by offering students more freedom in the learning process (Febriani et al., 2022). However, neither of these studies addresses the specific role of science curriculum content development in shaping student learning satisfaction. This research is essential because it can assist policymakers in assessing the impact of science curriculum development on teaching and learning processes, student outcomes, and overall student satisfaction and adaptation to changes in curriculum content. By understanding these effects, it is hoped that effective strategies can be identified to address challenges and ensure that curriculum policy changes contribute to quality improvement. Given this context, the focus of the research is to examine how teacher adaptation affects the development of science-based curriculum content and its influence on student learning satisfaction.

2. METHOD

This study employs a quantitative approach using a descriptive survey method. According to Sugiyono (2019), survey research involves collecting data from a representative sample to describe characteristics, attitudes, or behaviors of a larger population. The descriptive method was applied by selecting a sample from the population and administering a questionnaire designed with a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The questionnaire consists of 20 items for each variable: teacher adaptability and student learning satisfaction. The teacher adaptability section includes statements such as:

1. *Teachers adjust learning content according to scientific developments.*
2. *Teachers teach basic science concepts in an easy-to-understand manner.*
3. *Teachers use experimental-based learning methods in lessons.*

Similarly, the student learning satisfaction section includes statements such as:

1. *I am satisfied with the way the teacher teaches the subject matter.*
2. *I enjoy learning because the teacher makes the lesson interesting.*
3. *I feel that the material taught is relevant to everyday life.*

This structured approach ensures that the collected data accurately reflects students' perceptions of teacher adaptability and their corresponding learning satisfaction levels.

This study was conducted at MTsN 1 Kota Bengkulu, with a population of 120 students. A sample of 50 eighth-grade students was selected using a simple random sampling technique to ensure equal representation.

The questionnaire used in the study underwent expert validation to confirm its content accuracy and relevance. Instrument validity was assessed using the Aiken index, while reliability was tested using the Cronbach's alpha coefficient, ensuring the consistency and dependability of the measurement tool. These validation and reliability tests confirm the robustness of the instrument in measuring teacher adaptability and student learning satisfaction effectively.

Table 1. Results of the Aiken Validity Index Coefficient of the Instrument

Instrument	V	Explanation
Teacher adaptation	0.78	Valid
Learning satisfaction	0.82	Valid

The reliability of the instrument is determined based on the Cronbach's alpha coefficient. The reliability of the teacher adaptation questionnaire instrument is 0.82, while the reliability of the learning satisfaction questionnaire instrument is 0.85; thus, the reliability value of the instrument is high (Taber, 2018). The questionnaire was given to students through teachers to collect data on teacher adaptation and student satisfaction levels regarding the development of science-based curriculum content. Data from the questionnaire were then analyzed using descriptive statistical methods. The data were analyzed using the T-Test, Average Difference, which first carried out the calculation of data analysis requirements, namely normality and homogeneity tests.

3. FINDINGS AND DISCUSSION

This study aims to determine the effect of teacher adaptation in developing science-based curriculum content on student learning satisfaction at Madrasah Tsanawiyah Negeri 1 Bengkulu City. The data collected in this study are data on teacher adaptation and learning satisfaction. Data were collected using a questionnaire of 20 statements to 50 research samples. The results of the study obtained from the research site were analyzed using SPSS 20.0, the results of the analysis were obtained in Table 2 and Figure 1 following:

Table 2. Descriptive data results

Statistics	Teacher Adaptation	Learning Satisfaction
Lowest score	55	60
Highest score	90	85
Mean	60	55
Median	50	50

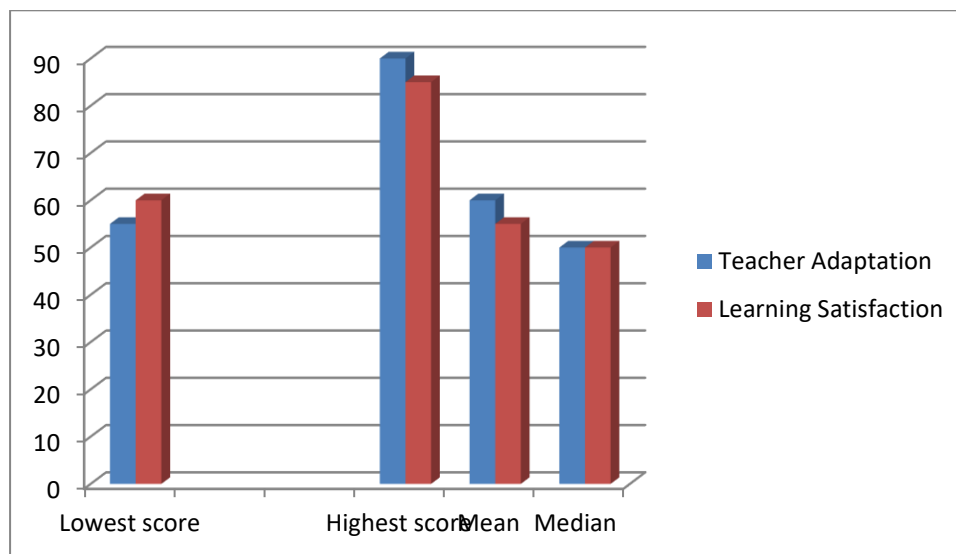


Figure 1. Comparison of Teachers' Adaptation Scores and Learning Satisfaction

Based on the analysis of the table above, it can be explained that from the 50 samples, the highest score obtained for the teacher adaptation variable is 90, and the lowest score is 55. Meanwhile, for the Learning Satisfaction table, the highest score is 85, and the lowest score is 60. The mean or average score for the teacher adaptation variable is 60, and for the learning satisfaction variable, it is 55. The results of the Normality Test between the teacher adaptation and learning satisfaction variables, calculated using residual values with the One-Sample Kolmogorov-Smirnov test, are shown in the following table.

Table 3. Recapitulation of Normality Test Calculation Results

	N	Kolmonogrov-Smirnov	P-value	Conclusion
Unstandardized Residual	50	0.55	0.56	Normal

Based on the table above, the Kolmonogrov-Smirnov value is 0.55, and the Asymp.Sig.(2-tailed) value is 0.56 (as $p\text{-value} = 0.770 > 0.05$ or H_0 is accepted). Thus, the Unstandardized Residual data from teacher adaptation and student learning satisfaction are normally distributed.

Table 4. Summary of Homogeneity Test Calculation Results

	Levene Statistic	df1	df2	Sig	Conclusion
Teacher adaptation to learning satisfaction	6.550	1	105	0.20	Homogenous

The Homogeneity Test is conducted with the intention of knowing whether the data distribution on the variables does not deviate from the characteristics of homogeneous data. The test above is conducted on the dependent regression variant or independent variables, with statistical results as in

table 4 obtained Levene Statistics = 6.550 df1 = 1, df2 = 105 and p-value = 0.20 > 0.05 or Ho is accepted. Thus, the data group comes from a homogeneous group.

Table 5. Recapitulation of t-Test Calculation Results

	Coefficients B	T-hit	P-value	F-hit	R Square	Conclusion
Teacher adaptation	0.467	5.473	0.000			
Learning satisfaction	20.374	7.149	0.000	77.249	0.700	H ₀ was rejected

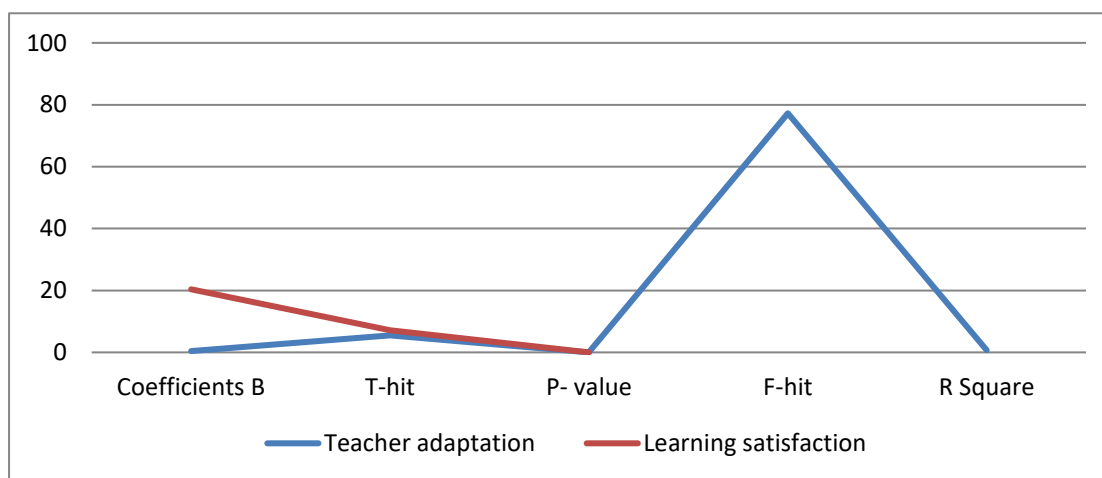


Figure 2. Hypothesis Calculation Curve

The results of the hypothesis test based on Table 5 or presented as the curve above in the Coefficients B column on Learning Satisfaction are 20.374, while the teacher adaptation value is 0.467. Coefficient B is called the regression direction coefficient and states the average change in variables for each change in variable X by one unit. The constant of 20.374 states that if there is no teacher adaptation, the value of student learning satisfaction is 20.347. The regression coefficient X of 0.467 states that for every additional teacher adaptation value, the student learning satisfaction value increases by 0.467. From the results of the analysis, t-hit = 5.473 and p-value = 0.000 < 0.05 or Ho is rejected. Thus, teacher adaptation has a positive effect on student learning satisfaction. From the results of the analysis, R-Square 0.700 was obtained, which means that 70% of the variation in the teacher adaptation variable is related to learning satisfaction.

Discussion

Based on the results of the analysis of teacher adaptation data in the development of science-based curriculum content and its impact on student learning satisfaction, it can be concluded that the average teacher adaptation score is higher than the student learning satisfaction score. The analysis also revealed a t-value of 5.473 and a p-value of 0.000 (less than 0.05), leading to the rejection of the null hypothesis (Ho). This indicates that teacher adaptation positively influences student learning satisfaction. Based on data analysis, teacher adaptability is very influential in increasing student learning satisfaction. This happens because teachers are able to adjust to student learning styles. Each student has a different learning style, such as visual, auditory, kinesthetic, or a combination of the three. Teachers who are able to adapt learning methods according to student learning styles can maximize student understanding and involvement in the learning process. For example, the use of images, videos,

or games in learning can increase student interest and motivation. In addition, teachers can increase student involvement (Widiyono & Millati, 2022). The use of various methods (such as group discussions, case studies, or project-based learning) will make students more actively involved in learning activities. Students tend to be more satisfied when they feel directly involved in the learning process, not just passively receiving information.

The data suggests that it is crucial for teachers to adapt when developing curriculum content, as this can significantly enhance student satisfaction with their learning experience. This finding aligns with the research by Nurrohim (2020), who identified several factors that hinder the adaptation process, including confusion, relationship barriers, challenges in the adaptation process, and ingrained habits. Teachers face numerous obstacles in adapting, one of which is insufficient content knowledge when developing science curricula.

In adapting to the science curriculum, teachers gain a clear understanding of the curriculum's content and adjust their teaching practices accordingly, following established curriculum guidelines. They prepare by gathering necessary resources from various sources, including science content development, diagnostic assessments, and strategies for differentiating instruction for students. Throughout this process, teachers must adapt to several systems, such as modifying lesson plans (RPP) and teaching modules, in order to effectively implement and maximize the development of the science curriculum content (Yamin & Syahrir, 2020).

The science curriculum emphasizes that the goal of science education in elementary schools is to offer students opportunities to engage in experiments and explore different phenomena. These skills are developed across all subjects, including science, throughout elementary and secondary education. Science education is crucial for preparing human resources to navigate the challenges of industrialization and globalization. This potential is evident in the focus of science schools on enhancing critical thinking, language skills, and ethical values, while also preparing students to address social issues related to scientific advancement and innovation. Additionally, science education fosters creativity, responsibility, and a perspective of freedom (Humaidi, 2014).

In science education, teachers need to innovate within the learning process to achieve the intended learning outcomes effectively. The careful selection of learning content plays a crucial role in delivering material in a way that ensures students grasp the objectives. One such innovation in science curriculum development is the use of ICT (Information and Communication Technology) to enhance the learning experience. The more aspects that meet students' needs and expectations, the greater their satisfaction (Muflihatun & Suryani, 2020). When students are satisfied, they are likely to develop a positive attitude; conversely, dissatisfaction can lead to negative attitudes and sharing of unfavourable experiences with others. As the central focus of the school, students naturally seek the highest level of satisfaction from all services provided, which in turn supports the advancement of science and technology education.

Student satisfaction plays a crucial role in the success of the learning process facilitated by the teacher. Students are likely to feel satisfied when their skills, abilities, and expectations align with the actual learning experience. On the other hand, a mismatch between these factors can lead to dissatisfaction. Learning satisfaction is an emotional state characterized by a positive attitude towards the learning activities, which aim to bring about change (Muflihatun & Suryani, 2020). Suwanto (2017) explains that student satisfaction reflects their emotional response—whether happiness or disappointment—based on how their expectations align with the reality of the learning process. As consumers of education, students will be satisfied if the school meets five key aspects of service: reliability, responsiveness, assurance, empathy, and tangible evidence. By ensuring satisfaction with these services, it is hoped that students' learning experiences will be more effective, leading to the achievement of desired educational outcomes.

The use of engaging teaching methods and tools plays a crucial role in evaluating student satisfaction with the curriculum. Innovative and real-world-relevant learning methods and tools can make education more engaging and meaningful for students (Firdausi et al., 2020; Vista & Sabandi,

2020). As a result, students are more likely to feel satisfied because they are more engaged and experience a more enjoyable and valuable learning process. Furthermore, satisfaction with evaluation and assessment indicates how students perceive the fairness, transparency, and usefulness of the assessments within the science curriculum. If students view assessments as constructive tools that help them identify their strengths and areas for improvement, it can enhance their overall satisfaction with the learning experience. Ultimately, the success of changes in the curriculum can be measured by how effectively the new curriculum addresses the diverse needs and expectations of students in these areas. By focusing on these factors, educators can pinpoint areas for improvement to boost student satisfaction and learning outcomes.

4. CONCLUSION

The findings of this study indicate that teacher adaptation significantly influences student learning satisfaction, as evidenced by a t-test value of 5.473 and a p-value of 0.000 (< 0.05). The results suggest that when teachers effectively adapt their instructional methods, student engagement and motivation improve. Additionally, integrating innovative teaching models can enhance teachers' Pedagogical Content Knowledge (PCK), further contributing to improved learning outcomes. However, this study has certain limitations, including a limited sample size and its focus on a single educational institution, which may affect the generalizability of the findings. Future research should explore diverse educational contexts and investigate how various teaching methods can enhance science curriculum content. Additionally, expanding the study to different school levels or regions could provide a broader perspective on the relationship between teacher adaptation and student satisfaction. To strengthen science education, stakeholders should implement policies that integrate Technological Pedagogical Content Knowledge (TPCK) training into teacher development programs, equipping educators with the necessary skills to create engaging and student-centred learning environments.

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