

Adaptive Teaching Methodologies and Testing Skills as Predictors of Instructional Interactions

Teresa C. Dalagan

Abstract. The primary objective of this study was to evaluate the influence of adaptive teaching methodologies and testing skills on instructional interactions among elementary school teachers in Maa District, Davao City, using a non-experimental quantitative design with a descriptive-correlation technique. A total of 210 elementary school teachers were selected as respondents through stratified random sampling. The researcher used modified and enhanced adapted survey questionnaires, which were pilot tested for reliability and internal consistency. The findings revealed that the extent of adaptive teaching methodologies and testing skills among teachers is generally extensive, with concept actualization and collaboration in assessment design being the most evident indicators. In contrast, idea sustainability and constructive item design were the least evident, indicating areas for improvement. The results showed a moderate positive relationship between adaptive teaching methodologies and instructional interactions and a strong positive relationship between testing skills and instructional interactions. Regression analysis confirmed that both adaptive teaching methodologies and testing skills significantly influence instructional interactions, with testing skills having a stronger predictive effect. These findings emphasize the importance of continuous professional development for teachers in both adaptive teaching strategies and assessment skills.

KEY WORDS

1. Adaptive Teaching 2. Testing Skills 3. Instructional Interactions

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1. Introduction

Instructional interactions in the classroom are critical to fostering a positive and effective learning environment. However, numerous problems can hinder these interactions, including inadequate teacher training, large class sizes, and insufficient resources. For instance, teachers may lack the necessary skills to engage students effectively, which can lead to decreased student motivation and participation. Additionally, large class sizes can make it difficult for teachers to provide individualized attention, thus negatively impacting student-teacher relationships and overall classroom dynamics. The variability in student needs and backgrounds further complicates the ability of teachers to create inclusive and supportive instructional interactions, underscoring the need for tailored strategies and approaches. In the United States, poor instructional interactions in the classroom present significant challenges, particularly when it comes to integrating adaptive teaching methodologies and testing skills.

One major issue is the variability in teacher preparation programs, which often do not adequately equip educators with the skills needed to implement adaptive teaching strategies effectively (Darling-Hammond, Hyler, / Gardner, 2019). This lack of preparation can result in teachers relying heavily on traditional, one-size-fits-all approaches, which do not cater to the diverse learning needs of students. Furthermore, high-stakes standardized testing in the U.S. often forces teachers to focus on test preparation rather than developing meaningful instructional interactions, which can undermine the benefits of adaptive teaching (Au, 2019). In the United Kingdom, similar issues and challenges affect instructional interactions in relation to adaptive teaching methodologies and testing skills. A significant concern is the pressure of national curriculum standards and assessments, which can limit teachers' ability to employ adaptive teaching methods. Teachers often feel constrained by the need to cover a wide range of content within a limited time frame, leaving little room for personalized and adaptive instruction. This focus on breadth over depth can hinder the development of strong instructional interactions, as teachers may not have the time or flexibility to address individual student needs effectively (Thompson / Wiliam, 2019). In Asia, issues with instructional interactions in the classroom often stem from rigid educational systems and a strong emphasis on rote learning and examination performance. In many Asian countries, the education system is highly exam-oriented, which can limit the implementation of adaptive teaching methodologies that focus on critical thinking and problem-solving (Cheng, 2019). Additionally, cultural factors and classroom dynamics can pose challenges to effective instructional interactions in Asia. In some contexts, traditional teacher-centered approaches dominate, with less emphasis on student-centered and interactive teaching methods (Ng, 2019). This can make it difficult for teachers to adopt

adaptive teaching strategies that require active student participation and engagement. Furthermore, large class sizes are common in many Asian countries, which can hinder the ability of teachers to provide individualized attention and support (Li / Yang, 2019). In the Philippines, poor instructional interactions in the classroom present significant challenges, particularly in the context of adaptive teaching methodologies and testing skills. One major issue is the traditional teacher-centered approach that dominates many classrooms, which often limits opportunities for meaningful student-teacher interactions (Bernardo / Mendoza, 2019). This approach can stifle student engagement and prevent the implementation of adaptive teaching methods that cater to diverse learning needs. Additionally, the lack of comprehensive teacher training programs focused on adaptive methodologies exacerbates this problem, as many educators may not have the skills or confidence to implement these strategies effectively (Navarro / Santos, 2020). Another challenge is the high student-to-teacher ratio prevalent in many public schools in the Philippines, which can impede the ability of teachers to provide individualized attention and support (David, 2019). Large class sizes make it difficult for teachers to engage with each student personally, hindering the development of effective instructional interactions. Moreover, the emphasis on high-stakes testing and standardized assessments can detract from the focus on adaptive teaching methodologies. Teachers may prioritize test preparation over innovative instructional strategies that could foster better interactions and deeper understanding among students (Alba, 2020). Addressing these challenges requires a concerted effort to provide teachers with the necessary training and resources to implement adaptive teaching methodologies and to rethink the current emphasis on standardized testing to allow for more holistic and interactive teaching practices. Given these challenges, there is a pressing necessity

to conduct studies aimed at improving instructional interactions in the classroom. Research that explores adaptive teaching methodologies and effective testing skills can provide valuable insights into how teachers can better cater to diverse student needs and enhance engagement (Darling-Hammond et al., 2020). Such studies can identify best practices and innovative strategies that promote positive and meaningful interactions between teachers and students. Moreover, understanding the impact of these methodologies on student outcomes can inform teacher training programs and policy decisions, leading to more effective educational practices (Hattie, 2019). Conducting this research is essential for developing evidence-based approaches that can transform classroom environments, making them more conducive to learning and student success. Despite the growing body of research on adaptive teaching methodologies and testing skills, there remains a significant research gap in understanding their influence on instructional interactions, particularly within the Philippine educational context. Most existing studies have been conducted in foreign settings, which may not fully capture the unique challenges and dynamics present in Philippine classrooms. Furthermore, there is a need for a quantitative approach to systematically examine the relationships and potential impacts of these variables on instructional interactions. Conducting such a study in the Philippines would provide valuable insights into how adaptive teaching methodologies and effective testing skills can enhance instructional practices, ultimately leading to improved educational outcomes in a setting that has been underrepresented in the current literature.

1.1. *Theoretical/Conceptual Framework*—

The study was anchored on Constructivist Learning Theory by Piaget (1979). Piaget's (1979) Constructivist Learning Theory posits that learners construct knowledge through experiences and interactions with their environ-

ment, which is highly relevant to adaptive teaching methodologies and testing skills. Adaptive teaching methodologies align with constructivist principles by creating dynamic and interactive learning experiences that accommodate individual student needs and promote active engagement (Piaget, 1979). Effective testing skills support this constructivist approach by providing meaningful assessments that inform instructional strategies and help tailor feedback to foster deeper understanding. This synergy between adaptive teaching and constructivist learning enhances instructional interaction, enabling students to build knowledge more effectively through personalized and contextually relevant experiences. This study was also anchored on Flavell's (1979) Metacognitive Theory. Flavell's (1979) Metacognitive Theory emphasizes the awareness and regulation of one's own cognitive processes, which is crucial in the context of adaptive teaching methodologies and testing skills. Adaptive teaching methodologies leverage metacognitive strategies by encouraging students to be aware of their learning processes and adjust their strategies accordingly. Teachers with strong testing skills can provide insightful feedback that enhances students' metacognitive abilities, helping them understand their strengths and areas for improvement (Flavell, 1979). This dynamic interplay between adaptive teaching and metacognitive awareness fosters a more engaged and self-regulated learning environment, ultimately improving instructional interaction and student outcomes. In support, Pennings et al. (2018) proposed that effective testing practices enables teachers to assess the effectiveness of their teaching strategies. By understanding which methods work best for diverse groups of students, teachers can tailor their approaches to enhance engagement and interaction among students from different cultural backgrounds. According to Sembirig (2018), test expert teachers can identify the diverse learning styles present in the class-

room. This understanding allows them to create instructional plans that cater to different preferences, promoting a more inclusive environment and facilitating increased student interaction. Moreover, Mast (2020) postulated that adaptive teaching methodologies can create a more dynamic and stimulating learning environment, capturing students' interest and attention more effectively. When teachers integrate contemporary issues and technologies into their teaching, it helps students see the relevance of their learning to the real world, increasing their engagement. According to Nayir and Saridas (2022), adaptive teaching methodologies can involve adapting teaching methods to cater to different learning styles and abilities, offering a more personalized learning experience to each student. As shown in Figure 1, the study is consist of three variables. This study has three variables. The first independent variable is the adaptive teaching methodologies or the practices and actions in which educators actively initiate, evolve, and apply novel ideas, techniques, or approaches in their teaching methods. The measures of adaptive teaching methodologies according to Gkontelos et al. (2022) are concept actualization or the process where teachers take innovative concepts, whether they be new teaching methods, pedagogical tools, technological integrations, or curriculum enhancements, and turn them into tangible changes or practices in their classrooms; idea sustainability or the ongoing application, refinement, and evaluation of innovative teaching methods, technologies, or curricular changes; teacher ingenuity or the process of conceiving new and creative ideas, methodologies, or approaches in their teaching practices; and idea promotion or the process where teachers not only create or adopt innovative ideas but also take proactive steps to pro-

mote these ideas among colleagues, school administrators, and the broader educational community. The second independent variable is testing skills or knowledge and skills educators need to develop, implement, and analyze student assessments effectively. Knowledgeable teachers use a variety of assessment types to get a comprehensive understanding of student learning. The measures of testing skills according to Ahmadi et al. (2022) are collaboration or the process that involves educators working together to develop, implement, and interpret assessments; assessment design or the process of creating educational assessments that accurately and effectively measure student learning and progress; Constructive item design or the techniques and tools that teachers use to gather information about student learning and performance; and data analysis or the process of interpreting and making sense of the information gathered from student assessments. The dependent variable was instructional interactions or the various forms of communication and engagement that occur between teachers and students during the learning process. The measures of instructional interaction according to Downer et al. (2015) are emotional support or the ways in which teachers provide a caring, nurturing, and empathetic environment that addresses the emotional and psychological needs of students; classroom organization or the process on how teachers structure, manage, and maintain the classroom environment to facilitate effective teaching and learning; and instructional support or the ways in which educators facilitate and enhance the learning process through direct teaching, guidance, and the provision of resources and activities that support students' academic growth.

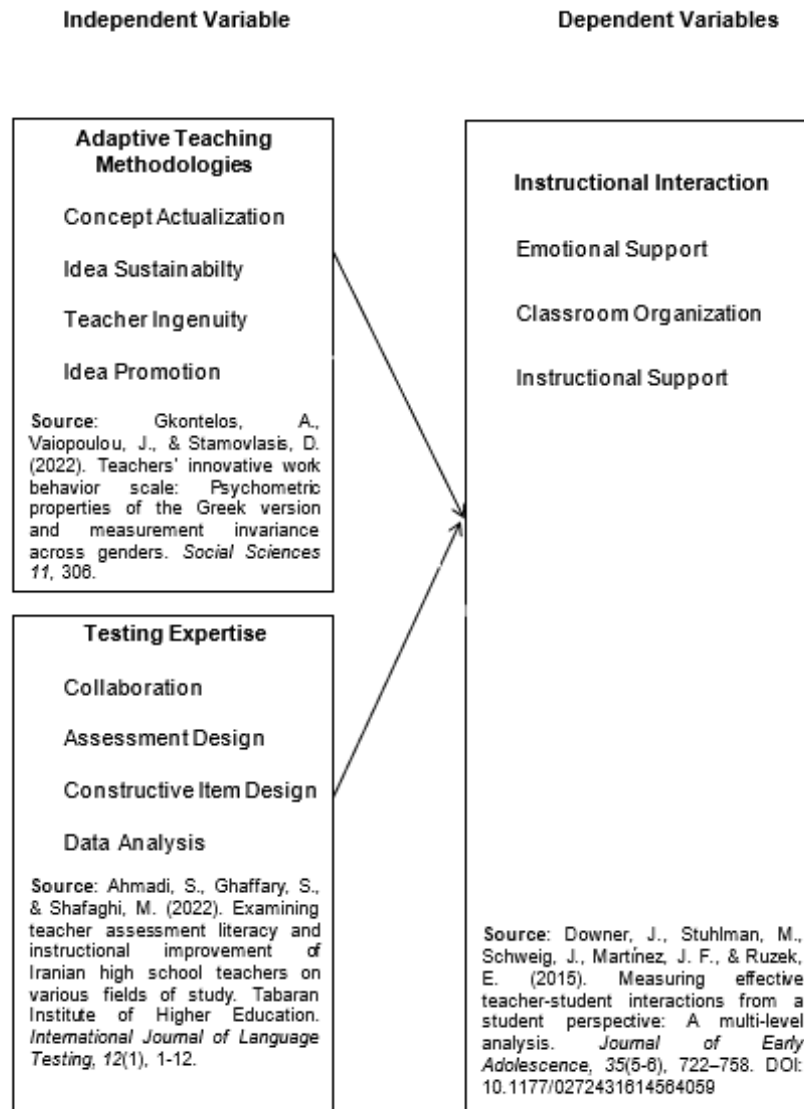


Fig. 1. Conceptual Framework

2. Methodology

This section contains the research design, research respondents, research ethics, research instrument, research procedure, data collection, and data analysis.

2.1. Research Design—In this study, the researcher utilized a quantitative research approach, specifically the descriptive-correlational technique through mediation analysis, to gather data, ideas, facts, and information pertinent to the study. According to Ahmad et al. (2019), quantitative research methodologies will systematically and impartially collect and analyze numerical data to understand phenomena, correlations, or trends. These methods involve statistical analysis to gain insights and draw conclusions from the data. Quantitative research focused on collecting and analyzing numerical data within a structured framework to explore various aspects of phenomena, relationships, or patterns. As described by Mohajan (2020), descriptive research techniques is methods used to depict, observe, and analyze the characteristics, behaviors, or phenomena of interest without manipulation or influence. The primary goal is to provide a comprehensive portrayal of the subject under study, focusing on describing existing conditions rather than exploring causality. Descriptive research allows researchers to outline and characterize various attributes, traits, or features of a population, group, or phenomenon, including demographic details, behaviors, attitudes, and other relevant factors. As defined by Hassan (2024), correlational research design is a type of non-experimental research used to explore the relationship between two or more variables. This approach assesses the extent to which changes in one variable coincide with changes in another, without manipulating either variable. The objective is to determine whether a statistical correlation exists between the variables and to understand the direction and strength of this relationship. Correlational research is crucial for advancing knowledge in

various fields by uncovering connections between variables, generating hypotheses, and informing practical applications and interventions. The descriptive correlational approach is highly appropriate for conducting a study on the influence of adaptive teaching methodologies and testing skills on instructional interactions. This approach allows researchers to observe and describe the relationships between these variables without manipulating them, providing a clear picture of how they interact in natural educational settings. By using this method, researchers can identify significant correlations and patterns that suggest how adaptive teaching methodologies and testing skills impact instructional interactions. Additionally, the descriptive correlational approach can help generate hypotheses for further experimental studies, providing a foundation for more in-depth exploration of these educational practices.

2.2. Ethical Consideration—The researcher observed promptly the protocols deemed necessary as the standard guidelines in carrying out the research study following the study protocol assessments criteria, particularly in managing the population and data. The survey questionnaires with supporting authors were submitted for further evaluation. After the approval from the Ethics Committee the researcher proceeded to the next phase of the study. Social Value By identifying effective teaching strategies and assessment practices, the research contributes to the development of more engaging and supportive classroom environments, which can lead to improved student learning outcomes. Additionally, the findings can inform policy decisions and educational reforms that prioritize teacher development and instructional excellence, thereby benefit-

ing the broader community. Understanding how adaptive methodologies and testing skills impact instructional interactions also supports the creation of more inclusive and equitable educational practices, ensuring that all students receive the attention and resources they need to succeed. Moreover, the research addresses critical gaps in the current understanding of how administrative mentoring can moderate the relationship between work decency and instructional competence among teachers. By focusing on the specific context of Maa District, the study provides localized insights that are directly applicable to the needs of teachers and schools in the area. This localized approach ensures that the societal benefits are tangible and immediately relevant, promoting sustainable educational improvements within the community. The emphasis on instructional competence and work decency also highlights the importance of supporting teachers not only professionally but also personally, recognizing their role as key contributors to societal development. In doing so, the study underscores the interconnectedness of teacher well-being, instructional quality, and overall educational success, reinforcing the importance of investing in teacher support systems. Informed Consent In conducting the study, the researcher ensured that all respondents, who were elementary school teachers, were fully informed about the purpose of the research. Each teacher received a clear explanation of the study's objectives, aiming to explore how adaptive teaching methodologies and testing skills influence instructional interactions. This transparency helped respondents understand the significance of their participation and how their contributions would aid in improving educational practices within their district. Additionally, the researcher provided detailed information about the benefits of the study, emphasizing how the findings could lead to enhanced teaching strategies and better student outcomes. By clearly communicating

the study's goals, the researcher fostered an environment of trust and openness, encouraging honest and thoughtful responses from the teachers. Moreover, respondents were informed about their rights throughout the study, including the right to withdraw at any point without any negative consequences. This assurance was crucial in respecting the autonomy and dignity of the teachers, ensuring that their participation was entirely voluntary and based on informed consent. The researcher also highlighted the measures taken to protect the confidentiality and anonymity of the respondents, reinforcing the ethical commitment to safeguarding their personal information. By addressing these aspects comprehensively, the researcher upheld the ethical standards required for conducting research involving human subjects. This careful approach to informed consent not only protected the rights of the respondents but also enhanced the integrity and credibility of the study. Finally, the informed consent process included providing respondents with contact information for the researcher and relevant authorities should they have any questions or concerns about the study. This ongoing support ensured that teachers felt comfortable seeking clarification or assistance, further reinforcing their trust in the research process. The researcher also used simple and clear language to make sure that all information was easily understandable, avoiding any technical jargon that might confuse the respondents. By prioritizing clear communication and respondent rights, the study maintained high ethical standards, fostering a respectful and collaborative research environment. This thorough informed consent process was essential in ensuring that the study was conducted ethically and that the respondents felt valued and respected throughout their participation. Vulnerability of Research Respondent Elementary school teachers, as the respondents of this study, may experience certain vulnerabilities, such as concerns about job security or fear of

judgment based on their instructional practices. These teachers often work in high-stress environments and may feel pressured to perform well, making them hesitant to share honest feedback or critiques about their own teaching methods. To mitigate these vulnerabilities, the researcher implemented strict confidentiality protocols, ensuring that all responses were anonymized and that individual teachers could not be identified in any reports or publications. This approach helped to create a safe space for teachers to express their true experiences and opinions without fear of repercussions or negative consequences. Additionally, the researcher provided assurances that participation was entirely voluntary and that teachers could withdraw from the study at any time without any impact on their employment or professional standing. By emphasizing the voluntary nature of the study and the measures taken to protect their identities, the researcher aimed to reduce any anxiety or reluctance teachers might have had about participating. Furthermore, the researcher offered support resources, such as counseling services, in case participation in the study triggered any emotional distress for the respondents. These proactive steps were essential in addressing the inherent vulnerabilities of the teachers, fostering an environment of trust and safety that encouraged genuine and open participation. Through these measures, the researcher demonstrated a commitment to the well-being and protection of the respondents, ensuring that their participation was both ethical and respectful. Privacy and Confidentiality To maintain privacy and confidentiality, the researcher will implement stringent measures to protect the identities and personal information of all participants. Data will be anonymized by assigning unique codes to each respondent, ensuring that individual responses cannot be traced back to specific individuals. All data will be stored securely, with access restricted to the researcher and authorized personnel only.

Findings will be reported in aggregate form, ensuring that no identifiable information is disclosed in any publications or presentations. Risk, Benefits and Safety The study posed minimal risks to the respondents, primarily related to the potential discomfort of discussing personal financial challenges and instructional practices. To address this, the researcher ensured that all interviews and discussions were conducted in a confidential manner, allowing teachers to share their experiences without fear of judgment or exposure. Additionally, the researcher provided information on available support services should any participant feel distressed during or after their involvement in the study. By prioritizing the emotional safety of the respondents, the researcher minimized any potential psychological risks associated with participation. These precautions were essential in maintaining a secure and supportive research environment. The primary benefits of the study included contributing to the improvement of educational practices and enhancing teachers' professional development. By identifying effective adaptive teaching methodologies and testing skills, the research provided actionable insights that could help teachers improve their instructional interactions and overall classroom performance. Additionally, the findings could inform administrative policies and mentoring programs, leading to better support systems for teachers in Maa District. This, in turn, would likely result in more effective teaching and improved student outcomes, benefiting the entire educational community. The study also offered teachers an opportunity to reflect on their practices and share their experiences, fostering a sense of collaboration and continuous improvement. To ensure the safety of the respondents, the researcher adhered to all ethical guidelines and protocols established for conducting research with human subjects. This included obtaining necessary approvals from relevant ethical review boards and ensuring that all data

was stored securely to prevent unauthorized access. The researcher also conducted all interactions in a respectful and non-coercive manner, ensuring that teachers felt comfortable and supported throughout the study. Additionally, the researcher maintained clear boundaries and professionalism during interviews and discussions, preventing any potential conflicts of interest or biases from influencing the outcomes. These safety measures were fundamental in protecting the well-being of the respondents and upholding the integrity of the research process. Justice The principle of justice was upheld by ensuring that all elementary school teachers in Maa District had equal opportunity to participate in the study, regardless of their background or experience level. The researcher implemented a fair selection process through purposive sampling, focusing on diverse schools and teachers to capture a wide range of experiences and perspectives. By avoiding any form of bias or discrimination in the recruitment and participation stages, the study promoted equity and inclusivity. Additionally, the researcher made sure that the benefits of the study, such as insights into effective teaching practices and potential policy improvements, were accessible to all participating teachers and their schools. This equitable approach not only enhanced the fairness of the research but also ensured that the findings were representative and beneficial to the entire educational community in Maa District.

Transparency Throughout the study, the researcher maintained a high level of transparency by clearly documenting and sharing research methods, data collection techniques, and analytical procedures. Each step, from the formulation of the research question to the conclusions drawn, was recorded meticulously to allow for reproducibility and scrutiny by peers. This approach ensured that other researchers could understand and evaluate the methodologies used, fostering trust and credibility in the

study's findings. The researcher also made all study materials, such as interview guides and consent forms, available upon request to any interested parties, further enhancing the transparency of the research process. The researcher committed to disseminating the findings of the study through several avenues to ensure that the results reached a broad audience, including educators, policy makers, and academic peers. Initially, the study's results were presented at local and national educational conferences, allowing for immediate feedback and discussion among educational professionals. Following these presentations, the research was submitted for publication in peer-reviewed educational journals, targeting readers who are directly involved in teaching, curriculum development, and educational policy. Additionally, the researcher planned to share the findings through online platforms and social media, catering to a broader audience interested in educational research and innovation. This multi-faceted dissemination strategy was designed to maximize the impact of the findings, contributing to ongoing discussions about effective teaching methodologies and improving educational practices at a wider scale. Qualification of the Researcher The researcher brought a solid academic background to the study, having been previously enrolled in courses like Methods of Research and Advanced Statistics. This educational experience provided the necessary skills to design a robust study and perform complex statistical analyses, such as regression analysis, ensuring that the research was conducted with high methodological standards. The knowledge gained from these courses was instrumental in crafting a research design that was both scientifically rigorous and relevant to the educational field. In the second year of her research, the researcher participated in various workshops and seminars that further enhanced her understanding and application of educational research methodologies, particularly in the context of adaptive teaching

strategies and their assessment. Conflict of Interest The researcher took careful steps to address and mitigate any potential conflicts of interest throughout the study. Prior to the commencement of the research, the researcher declared any affiliations or relationships that could be viewed as a potential conflict of interest to the academic board and the study participants. She ensured that her interactions with the respondents and the analysis of the data remained unbiased and objective. The researcher did not have any direct authority over the respondents nor did she stand to benefit personally from the study's outcomes. This precaution helped to maintain the integrity of the research process and uphold the trust placed in her by the respondents and the academic community.

Adequacy of Facilities The researcher ensured that the facilities used for the study are adequate to support the research activities and safeguard respondent well-being. This includes securing appropriate spaces for conducting interviews or focus groups, ensuring privacy and comfort. Technological resources, such as secure data storage systems, will be used to protect the confidentiality of the information collected. The researcher also ensured that all necessary materials and equipment are available and in good working order to facilitate the smooth execution of the research. **Community Involvement** Community involvement was a cornerstone of the research process, ensuring that the study not only reflected the realities of the classroom but also engaged with the broader educational community in Maa District. The researcher collaborated with local schools and teacher associations to design the study, seeking input from potential respondents to tailor the research questions and methods to their specific context and needs. This collaborative approach helped to build a sense of ownership and investment among the community members, who felt that their experiences and challenges were being acknowledged and

addressed. In the latter stages of the research, the findings were shared with the participating schools through workshops that facilitated discussions on implementing the recommended teaching and testing strategies. These workshops served as a platform for teachers to share their experiences and insights, further enriching the study's impact and relevance to the local educational landscape.

2.3. Research Respondents—The respondents of the study were the elementary school teachers in Maa District, Davao City. In this study, 210 respondents were selected through a stratified random sampling technique. Stratified random sampling, according to Leedy and Ormrod (2018), is a probabilistic sampling technique used in research to select a representative sample from a population by dividing it into subgroups or strata based on certain characteristics. Within each stratum, a random sample was drawn, and these samples were combined to create the final representative sample for the study. This method ensured that each subgroup was adequately represented in the sample, allowing for more accurate generalizations and inferences to be made about the entire population. In this study, several inclusion criteria were established to ensure the relevance and reliability of the data collected. First, respondents needed to have a minimum of three years of teaching experience to ensure they had sufficient practical knowledge and experience with various instructional methods. Second, teachers needed to be currently employed in elementary or secondary education settings, as this study focused on the impact of teaching methodologies and testing skills within these educational levels. Finally, teachers needed to be actively involved in instructional planning and delivery, as their firsthand experiences and insights were crucial for understanding the practical application and impact of adaptive teaching and testing skills on instructional interactions.

2.4. *Research Instrument*—The study employed questionnaires adapted from different studies and will be modified to fit the context of the respondents of this study. The questionnaire was pilot tested in a nearby school and will obtain a Cronbach’s alpha value greater than 0.700, ensuring that the questionnaires have a high level of internal consistency. The scaling was done by using one-half of the value of 5 as the average cut-off point or the fair level, with a uniform interval of 0.80. Before the administration of the instrument, it will be subject to validation by three experts and will be revised according to their expert comments. The instrument was divided into three parts. The first part of the instrument concerned about adaptive teaching methodologies which was composed of statements measured in terms of concept actualization, idea sustainability, teacher ingenuity, and idea promotion. The new scale acquired a Cronbach’s alpha value of 0.808 described as good and interpreted as reliable. As a guide in determining the extent of adaptive teaching methodologies, the researcher used the range of means, description, and interpretation as presented below:

Ranges of Mean, Descriptive Level, and Interpretation of Adaptive Teaching Methodologies

Ranges of Mean	Descriptive Level	Interpretation
4.20 – 5.00	Very Extensive	Adaptive teaching methodologies is always observed.
3.40 – 4.19	Extensive	Adaptive teaching methodologies is oftentimes observed.
2.60 – 3.39	Moderately Extensive	Adaptive teaching methodologies is sometimes observed.
1.80 – 2.59	Less Extensive	Adaptive teaching methodologies is seldom observed.
1.00 – 1.79	Not Extensive	Adaptive teaching methodologies is never observed.

The second part of the instrument was about testing skills. The questionnaire was measured in terms of collaboration, assessment design, constructive item design, and data analysis. The new scale acquired a Cronbach’s alpha value of 0.943 described as excellent and interpreted as highly reliable. The researcher modified the questionnaire by grouping all the items according to domain. All the items in the questionnaire was measured on a 5-point Likert scale ranging from (1) Strongly Disagree to (5) Strongly Agree. As a guide in determining the extent of testing expertise, the researcher used the range of means, description, and interpretation as presented below:

The third part of the instrument ascertained the instructional interactions. It was composed of statements measured in terms of emotional support, classroom organization, and instructional

Ranges of Mean, Descriptive Level, and Interpretation of Testing Skills

Ranges of Mean	Descriptive Level	Interpretation
4.20 – 5.00	Very Extensive	Testing skills is always manifested.
3.40 – 4.19	Extensive	Testing skills is oftentimes manifested.
2.60 – 3.39	Moderately Extensive	Testing skills is sometimes manifested.
1.80 – 2.59	Less Extensive	Testing skills is seldom manifested.
1.00 – 1.79	Not Extensive	Testing skills is never manifested.

tional support. The new scale acquired a Cronbach's alpha value of 0.815 described as good and interpreted as reliable. The researcher modified the questionnaire by grouping all the items according to domains. In answering the questionnaire, the respondents made use of a 5-point Likert scale as follows: 5–Strongly Agree, 4–Agree, 3–Somewhat Agree, 2–Disagree, 1–Strongly Disagree. As a guide in determining the extent of instructional interactions, the researcher will use the range of means, descriptions, and interpretations as presented below:

Ranges of Mean, Descriptive Level, and Interpretation of Instructional Interactions

Ranges of Mean	Descriptive Level	Interpretation
4.20 – 5.00	Very Extensive	The instructional interactions is always evident.
3.40 – 4.19	Extensive	The instructional interactions is oftentimes evident.
2.60 – 3.39	Moderately Extensive	The instructional interactions is sometimes evident.
1.80 – 2.59	Less Extensive	The instructional interactions is seldom evident.
1.00 – 1.79	Not Extensive	The instructional interactions is never evident.

2.5. Data Gathering Procedure—Permission to Conduct the Study The first step in getting permission to conduct the study was for the researcher to obtain an endorsement from the Dean of the Graduate School at The Rizal Memorial Colleges, Inc., Davao City. This endorsement officially recognized and supported the research project, confirming its academic value and relevance to the institution's research goals. After this, the researcher sought ethi-

cal clearance from the Graduate School RMC-Research Ethics Committee (GSRMC-REC). Getting this clearance was essential because it confirmed that the study met the necessary ethical standards, especially regarding confidentiality, consent, and the welfare of the respondents. Once the endorsement and ethical clearance were in place, the researcher then asked the Schools Division Superintendent in Davao City for permission to carry out the study in the schools of Maa District. This request included copies of the endorsement from the Dean and the ethical clearance certificate to show that the study followed academic and ethical standards. If the superintendent approved, the researcher next reached out to the principals of the schools in Maa District. In this stage, the researcher detailed the study's purpose and its expected benefits for the educational community, and discussed what would be required from the schools and their teachers. This ensured everyone understood their role and fostered cooperation.

Distribution and Retrieval of the Questionnaire The first step in the distribution of the questionnaire involved the selection of research respondents, which was based on the established inclusion criteria ensuring all respondents were elementary school teachers in Maa District in Davao City. This was followed by a pilot test conducted on a small group of respondents to ensure the clarity and reliability of the questionnaire. The pilot test helped to identify any ambiguities or biases in the questions and allowed the researcher to make necessary adjustments. This testing phase was crucial for validating the questionnaire's effectiveness in accurately collecting the intended data. Following the successful pilot test, the main distribution of the research questionnaires occurred. The selected respondents were given sufficient time to complete the questionnaire, ensuring they could provide thoughtful and thorough responses. Respondents had the flexibility to choose their preferred method of completion, either face-to-face or

online, accommodating their convenience and comfort levels. This approach not only facilitated a higher response rate but also accommodated the diverse preferences and schedules of the respondents, potentially enhancing the quality and accuracy of the data collected. The final phase involved the retrieval of the completed questionnaires. The researcher established a deadline for submission, which was communicated clearly at the time of distribution. Respondents submitted their completed questionnaires through the predetermined method, either returning the physical documents in face-to-face settings or submitting them electronically. Once all questionnaires were collected, the researcher proceeded with data analysis, using statistical software to quantify the results and examine the influence of adaptive teaching methodologies and testing skills on the instructional interactions.

Collation and Statistical Treatment of Data After collecting the completed survey questionnaires, the first step was to organize and tally the data. Each response was entered into a Microsoft Excel spreadsheet and categorized based on different variables like curriculum management, student outcomes, and educational quality. Organizing the data carefully was important to ensure that the analysis that followed was accurate and well-structured. Using Excel helped to sort and filter the data, making it easier to review the information and prepare it for more detailed statistical analysis. Next, the researcher performed descriptive statistical analysis to get an initial understanding of the data. This involved calculating the average, or mean, for each variable to see the central trends. The average values showed the common responses to different questions, providing a basic idea of how teachers generally perceived adaptive teaching methodologies, testing skills, and instructional interactions. The last step involved using inferential statistical tests to examine the relationships outlined in the study's goals. The Pearson Product Moment

Correlation was used to measure how strongly and in what direction different variables like adaptive teaching methodologies, testing skills, and instructional interactions were related. Afterward, regression analysis was used to see how much adaptive teaching methodologies and test-

ing skills could predict changes in instructional interactions. This type of analysis not only confirmed the expected relationships but also gave measurable evidence that could help shape educational policies and practices.

2.6. Data Analysis—The following were the statistical tools utilized by the researcher in processing the gathered data: Mean. This was used in characterizing the adaptive teaching methodologies and testing expertise as predictors of instructional interactions. This will be used to supply the answers for objectives 1, 2, and 3. Pearson Product Moment Correlation. It was used in this study to assess the significant

relationship between adaptive teaching methodologies and instructional interactions, and the relationship between testing expertise and instructional interactions. This will be used to supply the answer for objective 3. Regression Analysis. It was applied to evaluate the influence of adaptive teaching methodologies and testing expertise on instructional interactions. This will be used to supply the answer for objective 5.

3. Results and Discussion

This chapter presents the results generated from the data gathered. It is sequenced based on the objectives of the study as presented in the first chapter. Thus, it presents the extents of adaptive teaching methodologies, testing skills, and instructional interactions of students; the significant relationship of teachers' adaptive teaching methodologies and testing skills on the instructional interactions of students; and the influence of teachers' adaptive teaching methodologies and testing skills on the instructional interactions of students in Maa District, Davao City.

3.1. Adaptive Teaching Methodologies—On Table 1, the results reveal that the extent of adaptive teaching methodologies among teachers in Maa District, Davao City, is generally rated as extensive, with an overall mean score of 3.46. This indicates that teachers frequently demonstrate adaptive teaching strategies in their classrooms, allowing them to effectively meet diverse student needs, enhance concept under-

standing, and foster creativity. Adaptive teaching methodologies are essential in promoting student engagement and learning, as they provide flexibility in instructional approaches, making lessons more relevant and accessible to students. According to Lambriex-Schmitz et al. (2020), adaptive teaching supports differentiated instruction, allowing teachers to tailor their strategies to accommodate individual learner preferences and capabilities.

Among the indicators, concept actualization is the most evident, with a mean score of 3.68, rated as extensive, suggesting that teachers are highly effective in helping students understand and apply complex concepts. This highlights

their ability to bridge theoretical ideas with practical applications, enhancing students' comprehension and retention. In contrast, idea sustainability is the least evident, with a mean score of 3.34, rated as moderately extensive. This

Table 1. Summary on Adaptive Teaching Methodologies of Teachers in Maa District, Davao City

Indicators	Mean	Descriptive Equivalent
Concept Actualization	3.68	Extensive
Idea Sustainability	3.34	Moderately Extensive
Teacher Ingenuity	3.47	Extensive
Idea Promotion	3.35	Moderately Extensive
Overall	3.46	Extensive

implies that while teachers introduce innovative ideas in the classroom, there may be challenges in maintaining the long-term impact of these ideas on student learning. As emphasized by Ismail and Mydin (2019), sustaining educational innovations requires consistent reinforcement and integration into the curriculum, ensuring that new ideas become part of the students' long-term knowledge and skills.

3.2. *Testing Skills of Teachers*—On Table 2 reveal that the extent of teachers' testing skills in Maa District, Davao City, is generally rated as extensive, with an overall mean of 3.41. This finding indicates that teachers frequently

demonstrate proficiency in various aspects of testing skills, including collaboration, assessment design, constructive item design, and data analysis. The findings suggest that teachers in Maa District, Davao City, demonstrate a solid foundation in testing skills, particularly in assessment design and collaboration. However, they may benefit from further professional development in designing constructive assessment items and using data analysis to enhance instruction. This aligns with the view of Rahimi et al. (2021), who emphasized that well-designed assessments are critical for accurately evaluating student understanding and guiding instruction.

Table 2. Summary on Testing Skills of Teachers in Maa District, Davao City

Indicators	Mean	Descriptive Equivalent
Collaboration	3.45	Extensive
Assessment Design	3.46	Extensive
Constructive Item Design	3.32	Moderately Extensive
Data Analysis	3.36	Moderately Extensive
Overall	3.41	Extensive

Among the indicators, assessment design is the most evident, with a mean of 3.46, reflecting teachers' strong ability to create effective assessments that measure student learning outcomes. In contrast, constructive item design is the least evident indicator, with a mean of 3.32, rated as moderately extensive. This sug-

gests that while teachers possess some skills in designing assessment items that promote higher-order thinking, they may benefit from further training in creating questions that challenge students to think critically, apply knowledge, and demonstrate creativity. According to Zlatkin-Troitschanskaia et al. (2019), effective data liter-

acy among teachers is essential for transforming assessment results into actionable insights that enhance teaching and learning.

3.3. Instructional Interactions—On Table 3, the results indicate that the extent of teachers' instructional interactions in Maa District, Davao City, is generally rated as extensive, with an overall mean score of 3.46. This finding suggests that teachers frequently demonstrate

effective instructional interactions, including emotional support, classroom organization, and instructional support, which contribute to a positive and productive learning environment. According to Tawa (2019), effective instructional interactions are essential for promoting student engagement, enhancing classroom management, and supporting student learning outcomes.

Table 3. Summary on Instructional Interactions in Maa District, Davao City

Indicators	Mean	Descriptive Equivalent
Emotional Support	3.34	Moderately Extensive
Classroom Organization	3.53	Extensive
Instructional Support	3.50	Extensive
Overall	3.46	Extensive

Among the indicators, classroom organization is the most evident, with a mean score of 3.53, rated as extensive, reflecting that teachers are generally effective in maintaining well-structured and orderly classrooms. This suggests that teachers prioritize establishing clear routines, managing resources, and arranging the physical space to optimize student engagement. Conversely, emotional support is the least evident, with a mean score of 3.34, rated as moderately extensive, indicating that while teachers sometimes provide emotional support to students, there may be room for improvement in creating a more empathetic and supportive classroom atmosphere. As noted by Rasmitadila et al. (2019), emotional support is crucial for fostering positive teacher-student relationships, enhancing student motivation, and promoting social-emotional learning.

3.4. Relationship of Adaptive Teaching Methodologies and testing Skills on Instructional Interactions—The findings on Table 4 reveal a moderate and significant positive re-

lationship between adaptive teaching methodologies and instructional interactions among teachers in Maa District, Davao City, with an r -value of 0.469 ($p = 0.000$), leading to the rejection of the null hypothesis at the 0.05 level of significance. This indicates that as teachers demonstrate higher levels of adaptive teaching methodologies—such as concept actualization, idea sustainability, teacher ingenuity, and idea promotion—they are moderately more likely to engage in effective instructional interactions, including providing emotional support, maintaining classroom organization, and offering instructional support. Adaptive teaching methodologies enable teachers to adjust their instructional strategies to accommodate diverse student needs, fostering positive classroom environments. According to Schipper (2019), adaptive teaching is essential for promoting inclusive education, as it empowers teachers to address individual learning preferences, thereby enhancing the quality of instructional interactions.

Table 4. Relationship of Adaptive Teaching Methodologies and Testing Skills on Instructional Interactions in Maa District, Davao City

Variables	r-value	p-value	Decision
Adaptive Teaching Methodologies	0.469*	0.000	Reject H_0
Testing Skills	0.735*	0.000	Reject H_0

*Significant at $p \leq .05$

Meanwhile, there is a strong and significant positive relationship between testing skills of teachers and instructional interactions, with an r-value of 0.735 ($p = 0.000$), also leading to the rejection of the null hypothesis at the 0.05 level of significance. This finding suggests that teachers with well-developed testing skills—such as collaboration, assessment design, constructive item design, and data analysis—are more likely to demonstrate effective instructional interactions. Proficiency in testing skills enables teachers to assess student learning accurately, provide meaningful feedback, and adapt their instructional approaches based on assessment data, which directly enhances their interactions with students. As emphasized by Zulaiha and Mulyono (2020), effective assessment practices are a cornerstone of quality teaching, as they allow teachers to identify student strengths, diagnose learning gaps, and provide targeted support, promoting positive teacher-student interactions.

3.5. Significance of the Influence of Adaptive Teaching Methodologies and Testing Skills on the Instructional Interactions—The results

Similarly, the results show that testing skills significantly influence instructional interactions among teachers, with a B value of 0.698 ($p = 0.000$) and a Beta coefficient of 0.651. This indicates that a one-unit increase in testing skills leads to a 0.698 unit increase in instructional interactions, suggesting that teachers who possess strong skills in assessment design, constructive item design, data analysis, and collaboration are more likely to demonstrate effective

of the regression analysis reveal that adaptive teaching methodologies significantly influence instructional interactions among teachers in Maa District, Davao City, with a B value of 0.247 ($p = 0.000$) and a Beta coefficient of 0.207. This means that for every one-unit increase in the application of adaptive teaching methodologies, there is a corresponding 0.247 unit increase in instructional interactions. These findings suggest that teachers who effectively implement adaptive teaching strategies, such as concept actualization, idea sustainability, teacher ingenuity, and idea promotion, are more likely to engage in meaningful instructional interactions with their students. According to Smyrnova-Trybulska et al. (2022), adaptive teaching allows educators to tailor their approaches to meet diverse student needs, promoting active learning and positive classroom dynamics. This emphasizes the importance of equipping teachers with skills that enable them to modify their instructional practices to optimize student engagement and participation.

instructional interactions. Teachers with proficient testing skills can assess student learning accurately, provide constructive feedback, and use assessment data to guide instructional decisions, directly enhancing their interactions with students. As emphasized by Sultana (2021), effective assessment is a critical component of quality instruction, enabling teachers to identify learning gaps, adjust their teaching approaches, and provide targeted support. The holistic anal-

Table 5. Significance of the Influence of Adaptive Teaching Methodologies and Testing Skills on Instructional Interactions

Variables	B	S.E.	Beta	p-value	Decisions
Adaptive Teaching Methodologies	.247	.059	.207	.000	Reject H0*
Testing Skills	.698	.053	.651	.000	Reject H0*
Adjusted $R^2 = .571$					
F-value = 140.323**					
p-value = .000					

*Significant at $p \leq .05$

ysis of the regression model, with an adjusted R^2 value of 0.571, indicates that 57.1% of the variance in instructional interactions can be explained by the combined influence of adaptive teaching methodologies and testing skills. The F-value of 140.323 ($p = 0.000$) confirms that the model is statistically significant, demonstrating that these two variables have a substantial and combined impact on instructional interactions. This suggests that both adaptive teaching methodologies and testing skills are essential for promoting effective teacher-student interactions, with testing skills showing a stronger influence. These findings highlight the need for schools to provide continuous training and support for teachers in both adaptive teaching and assessment skills, ensuring that they are well-prepared to create positive and effective

learning environments. The findings align with the Constructivist Learning Theory by Piaget (1979), which emphasizes that learners actively construct knowledge through meaningful interactions and experiences. Adaptive teaching methodologies, which promote concept actualization and student engagement, support this theory by encouraging active learning and personalized instruction. Additionally, the results support Flavell's (1979) Metacognitive Theory, as the use of testing skills, including data analysis and feedback, promotes metacognitive awareness among students. Teachers who provide constructive feedback and engage in reflective assessment practices help students become aware of their own learning processes, fostering self-regulation and critical thinking.

4. Conclusions and Recommendations

This part of the paper presents the conclusion and recommendation of the researcher. The discussion is supported by the literature presented in the first chapters and the conclusion is in accordance with statements of the problem presented in this study.

4.1. Findings—The primary objective of this study was to evaluate the combined influence of adaptive teaching methodologies and testing skills on the instructional interactions utilizing non-experimental quantitative design using descriptive-correlation technique. The

researcher selected the 210 elementary school teachers in Maa District in Davao City as the respondents through stratified random sampling method. The researcher made use of modified and enhanced adapted survey questionnaires which was pilot tested in a nearby school to ensure high reliability and internal consistency

of the items in the instrument. The extent of adaptive teaching methodologies among teachers in Maa District, Davao City, is generally rated as extensive, indicating that teachers frequently apply flexible and personalized instructional strategies. Among the indicators, concept actualization is the most evident, reflecting teachers' ability to help students understand complex concepts through adaptive methods. In contrast, idea sustainability is the least evident, suggesting that teachers may require further support in maintaining and reinforcing introduced ideas over time. The extent of testing skills among teachers in Maa District, Davao City, is also rated as extensive, demonstrating that teachers frequently apply effective assessment techniques in their instructional practices. Collaboration in assessment design is the most evident, reflecting teachers' engagement in sharing best practices and aligning assessments with educational objectives. On the other hand, constructive item design is the least evident, indicating a need for further training in creating assessments that effectively measure higher-order thinking skills. The extent of instructional interactions among teachers in Maa District, Davao City, is generally rated as extensive, suggesting that teachers frequently engage in meaningful and supportive interactions with their students. Classroom organization is the most evident, highlighting that teachers maintain well-structured learning environments that support active participation. Emotional support is the least evident, indicating that teachers may benefit from further training in providing empathetic and supportive communication during instructional interactions. The results reveal a moderate positive relationship between adaptive teaching methodologies and instructional interactions, indicating that teachers who apply adaptive teaching strategies are more likely to engage in effective instructional interactions. Among the two variables, testing skills demonstrate a stronger relationship with instruc-

tional interactions, suggesting that teachers with strong assessment skills are more capable of maintaining productive teacher-student interactions. These findings highlight the importance of enhancing both adaptive teaching methodologies and testing skills to support effective instructional practices. The regression analysis confirms that both adaptive teaching methodologies and testing skills significantly influence instructional interactions, with testing skills having a stronger predictive effect. The model explains the variance in instructional interactions, indicating that these two variables are critical factors in promoting effective teacher-student engagement. These findings emphasize the importance of continuous professional development for teachers in both adaptive teaching strategies and assessment skills.

4.2. Conclusions—Based on the findings of this study several conclusions were generated: The results conclude that the extent of adaptive teaching methodologies among teachers in Maa District, Davao City, is generally extensive, with concept actualization being the most evident. This implies that teachers are skilled at helping students understand complex concepts through flexible instructional strategies. However, the moderately extensive rating in idea sustainability suggests a need to further strengthen teachers' ability to maintain and reinforce introduced ideas over time. The findings show that the extent of testing skills among teachers is generally extensive, with collaboration in assessment design being the most evident indicator. This suggests that teachers actively engage in sharing best practices and aligning assessment strategies with educational objectives. However, the moderately extensive practice of constructive item design indicates that teachers may benefit from further training in creating assessments that effectively measure higher-order thinking skills. Moreover, the extent of instructional interactions among teachers is generally extensive, with classroom organization being

the most evident. This reflects teachers' ability to maintain well-structured learning environments that support active student participation. However, the moderately extensive rating in emotional support implies a need for further emphasis on providing empathetic and supportive communication during teacher-student interactions. The results further reveal that adaptive teaching methodologies and testing skills both have significant positive relationships with instructional interactions, with testing skills showing a stronger influence. This indicates that teachers who possess strong testing skills are more likely to maintain effective and supportive instructional interactions. Schools should continue to enhance teachers' assessment skills and provide training on adaptive teaching strategies to support meaningful teacher-student engagement. Lastly, the findings confirm that both adaptive teaching methodologies and testing skills significantly influence instructional interactions, with testing skills having a stronger predictive effect. This result aligns with Piaget's Constructivist Learning Theory (1979), which emphasizes that students construct knowledge through active engagement, and Flavell's Metacognitive Theory (1979), which highlights the importance of self-regulation and awareness in learning. Schools should prioritize professional development that strengthens teachers' skills in both adaptive instruction and effective assessment.

4.3. Recommendations—To enhance adaptive teaching methodologies, which are generally extensive, schools should focus on improving idea sustainability, which is rated as moderately extensive. Teachers can be provided with training on strategies for reinforcing and building upon introduced concepts, such as through the use of concept mapping, continuous review, and real-world applications. Additionally, collaborative planning sessions can help teachers

design lessons that promote long-term retention of knowledge. Regarding testing skills, the focus should be on enhancing constructive item design, which is rated as moderately extensive. Schools are encouraged to conduct workshops that train teachers on designing assessment items that target higher-order thinking skills, such as analysis, synthesis, and problem-solving. Further, peer review sessions can be implemented, where teachers collaboratively refine and improve their assessment items. For instructional interactions, schools should prioritize strengthening emotional support, which is rated as moderately extensive. Teachers should receive training on effective communication strategies that foster a positive classroom climate, including active listening, empathetic responses, and constructive feedback. Schools can also integrate social-emotional learning (SEL) programs to equip teachers with practical tools for providing emotional support. To further enhance the relationship between adaptive teaching methodologies and instructional interactions, schools should focus on promoting idea sustainability, as this aspect shows moderate practice. Teachers should be encouraged to integrate reflective practices, such as periodic reviews and real-world applications, to help students retain and apply learned concepts. Collaborative planning among teachers can also enhance the sustainability of ideas. Lastly, the significant influence of testing skills on instructional interactions indicates that improving teachers' constructive item design can further enhance instructional quality. Schools are advised to offer training programs on effective item construction, including open-ended questions, scenario-based assessments, and performance tasks. This approach will help teachers design assessments that not only measure student knowledge but also foster critical thinking and problem-solving skills.

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