International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

Technology-Based Remedial Classes on Grade 9 Students' Academic Skills and Performance in Science

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Abstract*—This study aimed to explore the relationship between Technology-Based Remedial Classes and Grade 9 students' academic skills and performance in Science at Binan Integrated National High School. Specifically, it assessed the level of Technology-Based Remedial Classes in terms of instructional delivery, instructional quality, relevance of content, teaching flexibility, and technical components, including accessibility, instructional design, usefulness of technology, and technical support. The study also evaluated the students' academic skills in terms of conceptual understanding, data analysis, knowledge acquisition, scientific inquiry, and scientific reasoning, as well as their performance based on formative and summative test results. A descriptive-correlational research design with a quantitative approach was utilized, involving 80 purposively selected Grade 9 students. Data were gathered through a researcher-made questionnaire and test results to measure the students' academic skills and performance. The findings revealed that Technology-Based Remedial Classes were implemented to a very great extent, significantly enhancing students' academic skills, particularly in conceptual understanding and scientific reasoning. However, the relationship between Technology-Based Remedial Classes and students' overall performance in science was found to be not significant, indicating that while technology-driven instruction improves academic competencies, other factors may influence test scores. The study concluded that effective implementation of Technology-Based Remedial Classes supports the development of students' academic skills. Nevertheless, further enhancements in instructional design, student engagement strategies, and targeted interventions are recommended to optimize academic performance*.

***Keywords*—** *Technology-based; Remedial Class; Academic Skills*.

I. INTRODUCTION

Academic readiness remains a significant challenge for many students, particularly in retaining essential skills and knowledge. Secondary teachers often struggle with students' declining academic retention, which is largely attributed to excessive engagement with digital gadgets and social media. While technology has become an integral part of students' daily lives, it has also contributed to shortened attention spans and decreased focus. However, instead of viewing technology solely as a distraction, integrating it effectively into learning can serve as a powerful tool to enhance student engagement and retention.

According to a 2018 nationwide survey on state-level developmental education policies, twenty states allow the use of "innovative developmental education instructional methods and interventions" (Whinnery & Pompelia, 2018). This indicates that technology has the potential to transform the teaching and learning environment by providing innovative ways to bridge learning gaps. These gaps are particularly evident among students requiring remediation and additional academic support.

Many pupils in grade 9 still struggle with grasping complicated scientific ideas in the context of science education. This struggle is reflected in their poor performance on science assessments and their declining confidence in their academic abilities. Educators have observed these persistent issues, emphasizing the urgent need for more targeted and effective remedial strategies.

The Programme for International Student Assessment (PISA) 2018 results further underscore the need for educational intervention in science. With an average science proficiency score of 357, which is much lower than the OECD average of 489, Filipino students were among the worst performers. A considerable proportion of students failed to meet the minimum proficiency levels, highlighting the necessity of improving science education through innovative teaching methods.

In line with this, technology-based learning has emerged as a promising approach to addressing these challenges. Studies have shown that integrating technology into instruction can significantly enhance student engagement, motivation, and academic achievement. For instance, Hwang et al. (2015) found that mobile learning applications improved students' comprehension of complex scientific concepts, increased motivation, and fostered self-efficacy. Similarly, Students in technology-supported, inquiry-based learning settings, according to Tsai et al. (2020), showed improved scientific inquiry abilities and a better grasp of scientific concepts.

Given these insights, this study aims to investigate the effect of technology-based remedial classes on the science achievement of Grade 9 students. By exploring how digital tools and resources can aid in mastering challenging scientific concepts, this research seeks to contribute to the growing field of technology-enhanced learning.

The findings could offer valuable strategies for improving science education in the science education, addressing the concerns raised by the PISA 2018 assessment, and supporting educators in implementing more effective remedial interventions.

Esther Clarito Salvador, "Technology-Based Remedial Classes on Grade 9 Students' Academic Skills and Performance in Science," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 227-236, 2025.

1.1 Statement of the Problem

Specifically, it sought to answer the following questions.

1. What is the level of Technology-Based remedial classes as to Teaching Delivery in terms of:

1.1 Instructional Delivery;
1.2 Instructional Quality;
1.3 Relevance of Content;
1.4 Teaching Flexibility; and

2. What is the level of Technology-Based remedial classes as to Technical Components in terms of :

2.1 Accessibility;
2.2 Instructional Design;
2.3 Usefulness of Technology; and
2.4 Technical Support?

3. What is the level of Students' Academic Skills in terms of:

3.1 Conceptual Understanding;
3.2 Data Analysis;
3.3 Knowledge Acquisition;
3.4 Scientific Inquiry; and
3.5 Scientific Reasoning?

4. What is the level of students' performance in science in terms of

4.1 formative test
4.2 summative test

5. Do technology – based remedial classes have significant relationship on students' science skills?
6. Do technology – based remedial classes have significant relationship on students' performance?

II. Methodology

A descriptive research design is used in this study because it allows for a systematic analysis of the relationship between technology-based remedial classes and Grade 9 students' science skills and performance. This approach is appropriate because it aims to describe and quantify the effects of the intervention without manipulating variables.

Overall, this design ensures that the study provides objective, data-driven findings that can inform educators and policymakers about the potential benefits of technology-enhanced learning strategies in addressing science learning gaps.

III. Results and Discussion

This chapter presented the different results and discussed the results from treating the data gathered in this study. All specific questions in Chapter 1 under the statement of the problem were answered in this chapter supported by tables. It presents the data gathered about the significant relationship between Technology-Based remedial classes as to Teaching Delivery, Technical Components and Students' Academic Skills. In particular, the study sought to address the following:

Level of Technology-Based remedial classes as to Teaching Delivery

In this study, the level of Technology-Based remedial classes as to Teaching Delivery refers to Instructional Delivery, Instructional Quality, Relevance of Content**,** and Teaching Flexibility.

The following tables show the statement, mean, standard deviation. remarks and verbal interpretation from the perspectives of respondents.

TABLE 1. Level of Technology-Based remedial classes as to Teaching Delivery in terms of Instructional Delivery

Statements	***Mean***	***SD***	***Remarks***
Instructional methods used in courses effectively engage learners in the learning process.	4.38	0.70	Very Good
Instructions clearly explains concepts and provides relevant examples to enhance understanding.	4.74	0.52	Very Good
Various instruction strategies are utilized to accommodate different learning styles.	4.45	0.6	Very Good
Technology is effectively integrated into instructional delivery to enhance learning outcomes.	4.43	0.63	Very Good
Opportunities for student interaction and collaboration are incorporated into lessons.	4.59	0.52	Very Good
Weighted Mean	**4.52**		
SD	**0.42**		
Verbal Interpretation	**Very Great Extent**		

Table 1 illustrates a high level of technology-based remedial classes in terms of teaching delivery, with an overall mean of M = 4.52, SD = 0.42. These results indicate that instructional delivery in such classes is effectively designed to enhance student learning experiences.

The findings strongly suggest that instructional methods successfully engage learners, as evidenced by the consistently high mean scores. Teachers clearly explain concepts and provide relevant examples, ensuring a comprehensive understanding of the subject matter. Additionally, a variety of instructional strategies are employed to cater to different learning styles, fostering inclusivity in the classroom. The seamless integration of technology into teaching delivery further enhances the effectiveness of the learning process. Furthermore, the incorporation of interactive and collaborative opportunities encourages student engagement and active participation.

These results further emphasize that well-executed teaching strategies in technology-based remedial classes contribute significantly to improved comprehension, student involvement, and overall academic success. By utilizing technology and diverse teaching approaches, educators create a more engaging and interactive learning environment, ultimately fostering motivation and better learning outcomes.

Table 2 presents the level of technology-based remedial classes in terms of instructional quality, with an overall mean of M = 4.40, SD = 0.46. These findings suggest that the instructional quality in technology-based remedial classes is effectively implemented to support student learning and academic achievement.

The results indicate that lessons are well-structured and logically sequenced, facilitating a better understanding of concepts. Additionally, the instructional content is deemed

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accurate, relevant, and aligned with learning objectives, ensuring that students receive meaningful and goal-oriented instruction. The assessments and evaluations used in these classes effectively measure learning outcomes, contributing to a comprehensive evaluation of student progress.

TABLE 2. Level of Technology-Based remedial classes as to Teaching Delivery in terms of Instructional Quality

Statements	***Mean***	***SD***	***Remarks***
Lessons are well-structured and logically sequenced to enhance understanding.	4.39	0.63	Very Good
Instructional content is accurate, relevant, and aligned with learning objectives.	4.36	0.68	Very Good
Assessments and evaluations accurately measure the achievement of learning outcomes.	4.38	0.58	Very Good
A variety of instructional strategies are used to accommodate different learning styles.	4.64	0.58	Very Good
Technology and multimedia resources are effectively integrated to enhance instruction.	4.21	0.72	Very Good
Weighted Mean	**4.40**		
SD	**0.46**		
Verbal Interpretation	**Very Great Extent**		

Moreover, the use of diverse instructional strategies to accommodate different learning styles is highly evident, as reflected in the highest mean score. The effective integration of technology and multimedia resources further enriches instructional delivery, making lessons more engaging and interactive.

These findings highlight that maintaining high instructional quality in technology-based remedial classes enhances student comprehension, engagement, and overall academic performance. By structuring lessons effectively, utilizing varied teaching strategies, and integrating technology, educators can create a more inclusive and dynamic learning environment that supports diverse learners.

TABLE 3. Level of Technology-Based remedial classes as to Teaching Delivery in terms of Relevance of Content

Statements	***Mean***	***SD***	***Remarks***
Topics covered are applicable to real-world situations and practical scenarios.	4.58	0.61	Very Good
Material presented is appropriate for the learners' level of knowledge and skills.	4.78	0.48	Very Good
Lessons integrate interdisciplinary perspectives to provide a broader understanding of the subject.	4.66	0.55	Very Good
Content is updated regularly to reflect current knowledge, trends, and advancements in the field.	4.68	0.57	Very Good
Assessments and activities are directly related to the instructional content and reinforce key concepts.	4.74	0.52	Very Good
Weighted Mean	**4.69**		
SD	**0.45**		
Verbal Interpretation	**Very Great Extent**		

Table 3 present the level of technology-based remedial classes in terms of the relevance of content, with an overall mean of M = 4.69, SD = 0.45. These findings indicate that the instructional content in technology-based remedial classes is highly relevant and effectively designed to align with students' learning needs and real-world applications.

The results highlight that the topics covered in these classes are applicable to practical scenarios, ensuring that students can connect theoretical knowledge with real-life experiences. Additionally, the instructional materials are appropriate for the learners' level of knowledge and skills, promoting better comprehension and academic growth.

The integration of interdisciplinary perspectives within lessons further enhances students' broader understanding of the subject, making learning more meaningful and comprehensive. The content is also regularly updated to reflect current trends, advancements, and knowledge, ensuring that students receive up-to-date and relevant information. Moreover, assessments and activities are well-aligned with instructional content, reinforcing key concepts and supporting deeper learning.

These findings emphasize that maintaining content relevance in technology-based remedial classes enhances student engagement, comprehension, and practical application of knowledge. By providing well-structured, updated, and interdisciplinary content, educators can ensure that learning remains meaningful, effective, and aligned with students' academic and professional growth.

TABLE 4. Level of Technology-Based remedial classes as to Teaching Delivery in terms of Teaching Flexibility

Statements	***Mean***	***SD***	***Remarks***
Teaching methods are adjusted based on the needs and progress of learners.	4.43	0.61	Very Good
Alternative explanations and examples are provided when concepts are difficult to understand.	4.8	0.40	Very Good
Lesson pacing is adjusted to ensure comprehension before moving to the next topic.	4.49	0.60	Very Good
Modifications to assessments and activities are made to support diverse learners.	4.38	0.62	Very Good
Students are given multiple ways to demonstrate their understanding of the material.	4.68	0.52	Very Good
Weighted Mean	**4.55**		
SD	**0.38**		
Verbal Interpretation	**Very Great Extent**		

Table 4 highlights the level of technology-based remedial classes in terms of teaching flexibility, with an overall mean of M = 4.55, SD = 0.38. These findings suggest that teaching flexibility is effectively implemented, allowing educators to adapt their instructional approaches based on students' varying needs and learning progress.

The results indicate that teachers make necessary adjustments to their teaching methods to accommodate students' learning needs. Additionally, alternative explanations and examples are frequently provided when students encounter difficulties in understanding concepts, as reflected in the highest mean score. Lesson pacing is also carefully adjusted to ensure comprehension before introducing new topics, helping learners build a strong foundational understanding.

Furthermore, modifications in assessments and activities are applied to support diverse learners, ensuring that instructional strategies remain inclusive and responsive. The availability of multiple ways for students to demonstrate their understanding further reinforces adaptive teaching practices that cater to different learning styles and abilities.

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These findings underscore the importance of teaching flexibility in technology-based remedial classes. By continuously adjusting instructional strategies, providing alternative explanations, and accommodating different learning needs, educators can create a more student-centered, effective, and supportive learning environment that enhances academic success.

TABLE 5. Composite of Technology-Based remedial classes as to Teaching Delivery

Indicators	***Weighted Mean***	***SD***	***Verbal Interpretation***
Instructional Delivery	4.52	0.42	Very Great Extent
Instructional Quality	4.40	0.46	Very Great Extent
Relevance of Content	4.69	0.45	Very Great Extent
Teaching Flexibility	4.55	0.38	Very Great Extent
Grand Mean	**4.54**		
SD	**0.43**		
Verbal Interpretation	**Very Great Extent**		

Table 5 reveals a high level of technology-based remedial classes in terms of teaching delivery, with a grand mean of M = 4.54, SD = 0.43. This signifies that the teaching strategies employed in these classes are effectively implemented to a very great extent, ensuring that instructional delivery, quality, relevance of content, and teaching flexibility contribute to enhanced student learning experiences.

This further suggests that the integration of well-structured instruction, adaptive teaching methods, and relevant content fosters a more engaging and effective remedial learning environment. Consequently, students are better supported in developing their academic competencies, leading to improved learning outcomes and overall success in their educational pursuits.

Level of Technology-Based remedial classes as to Technical Components

In this study, the level of Technology-Based remedial classes as to Technical Components refers to Accessibility**,** Instructional Design, Usefulness of Technology, and Technical Support.

The following tables show the statement, mean, standard deviation. remarks and verbal interpretation from the perspectives of respondents.

TABLE 6. Level of Technology-Based remedial classes as to Technical Components in terms of Accessibility

Statements	***Mean***	***SD***	***Remarks***
Accessible for all kinds of users, whether teachers, students, instructors etc.	4.38	0.50	Very Good
System is easy to use and manipulate which also provides multiple ways for the students/users to access information they needed.	4.78	0.45	Very Good
Convenient and accessible anywhere and allow the users to acquire the same information, engage in the same interactions, and enjoy the same services.	4.81	0.39	Very Good
Components do not require too much time to access.	4.89	0.36	Very Good
Accessible from time to time, shareable, and can be followed by the users.	4.90	0.34	Very Good
Weighted Mean	**4.84**		
SD	**0.32**		
Verbal Interpretation	**Very Great Extent**		

As presented in Table 6, there is a high level of accessibility in terms of the technical components of technology-based remedial classes, with a grand mean of M = 4.84, SD = 0.32. This implies that the system used in these classes is highly accessible, ensuring that students, teachers, and other users can easily navigate and utilize its features without difficulty.

There is a strong agreement that the system provides multiple ways for users to access information conveniently and efficiently. It allows students and instructors to acquire the same content, engage in similar interactions, and access essential services regardless of their location. Furthermore, the technical components do not require excessive time to load or operate, ensuring smooth and uninterrupted learning experiences. The system's shareability and consistent availability further enhance its usability, making it a reliable tool for educational purposes.

This implies further that maintaining a high level of accessibility in technology-based remedial classes can significantly improve user engagement, promote seamless learning, and provide equal opportunities for all learners. By ensuring ease of use, real-time availability, and efficient access to instructional content, the system supports a more effective and inclusive educational experience that enhances students' learning outcomes.

TABLE 7. Level of Technology-Based remedial classes as to Technical Components in terms of Instructional Design

Statements	***Mean***	***SD***	***Remarks***
Technology-based remedial classes utilize adaptive learning systems that tailor instructional content based on students' individual progress and needs.	4.88	0.33	Very Good
Digital platforms integrate various instructional media, such as videos, interactive simulations, and gamified assessments, to enhance engagement and cater to diverse learning styles.	4.81	0.45	Very Good
Learning analytics and artificial intelligence provide real-time feedback to both students and teachers, enabling targeted interventions and continuous improvement.	4.88	0.33	Very Good
Instructional design in technology-based remedial programs follows a structured progression, incorporating scaffolding techniques like guided practice, hints, and step-by-step tutorials.	4.83	0.38	Very Good
Digital remedial instruction ensures accessibility through assistive technologies, language translation tools, and customizable interfaces to accommodate learners with different abilities and backgrounds.	4.91	0.28	Very Good
Weighted Mean	**4.86**		
SD	**0.28**		
Verbal Interpretation	**Very Great Extent**		

As shown in Table 7, there is a high level of instructional design in the technical components of technology-based remedial classes, with a grand mean of M = 4.86, SD = 0.28. This suggests that the instructional design of these programs is effectively structured, integrating various technological features to enhance learning experiences and accommodate diverse student needs.

There is strong agreement that technology-based remedial classes utilize adaptive learning systems that personalize instructional content based on students' progress. Additionally, digital platforms incorporate multimedia elements such as videos, interactive simulations, and gamified assessments, making learning more engaging and accessible. The integration of learning analytics and artificial intelligence provides real-time feedback, enabling timely interventions that support continuous improvement.

This suggests further that a well-structured instructional design, supported by digital tools and adaptive learning technologies, enhances student engagement, improves comprehension, and fosters individualized learning experiences. By incorporating assistive technologies, scaffolding techniques, and interactive learning resources, technology-based remedial classes can provide a more inclusive and effective educational environment, ultimately leading to better learning outcomes.

TABLE 8. Level of Technology-Based remedial classes as to Technical Components in terms of Usefulness of Technology

Statements	***Mean***	***SD***	***Remarks***
Multimedia resources, such as videos and interactive simulations, improve comprehension of complex topics.	4.70	0.51	Very Good
Technology facilitates collaboration and communication among learners and instructors.	4.83	0.38	Very Good
Educational content help reinforce and extend learning beyond the classroom.	4.76	0.56	Very Good
Integration of technology promotes independent learning and self-paced study.	4.74	0.52	Very Good
Technology is used appropriately to support different learning styles and needs.	4.76	0.53	Very Good
Weighted Mean	**4.76**		
SD	**0.40**		
Verbal Interpretation	**Very Great Extent**		

As shown in Table 8, there is a high level of usefulness of technology in the technical components of technology-based remedial classes, with a grand mean of M = 4.76, SD = 0.40. This suggests that technology plays a significant role in enhancing learning experiences, making instruction more effective, engaging, and accessible for students.

There is strong agreement that multimedia resources, such as videos and interactive simulations, improve students' comprehension of complex topics. Additionally, technology fosters collaboration and communication among learners and instructors, reinforcing and extending learning beyond the classroom. The integration of digital tools also promotes independent learning and self-paced study, allowing students to progress at their own pace while accommodating different learning styles and needs.

This suggests further that the effective use of technology in remedial classes enhances instructional delivery, facilitates deeper understanding, and provides students with greater flexibility in their learning journey. By incorporating diverse technological tools, educators can create a more inclusive and adaptive learning environment that supports academic success.

As shown in Table 9, there is a high level of technical support in the technical components of technology-based remedial classes, with a grand mean of M = 4.86, SD = 0.28. This suggests that sufficient technical assistance is provided to ensure the smooth implementation and utilization of digital tools in learning.

TABLE 9. Level of Technology-Based remedial classes as to Technical Components in terms of Technical Support

Statements	***Mean***	***SD***	***Remarks***
Technical support is readily available when issues arise with digital tools and platforms.	4.88	0.33	Very Good
Technical support and guidance are available to ensure the effective use of technology in learning.	4.85	0.36	Very Good
Clear instructions and guidelines are provided for troubleshooting common technical issues.	4.76	0.53	Very Good
Training and tutorials are provided to enhance the effective use of technology in learning.	4.89	0.36	Very Good
Guidelines are appropriate for any kind of learners and/or users.	4.90	0.34	Very Good
Weighted Mean	**4.86**		
SD	**0.28**		
Verbal Interpretation	**Very Great Extent**		

There is strong agreement that technical support is readily available when issues arise, with clear instructions and troubleshooting guidelines provided for users. Additionally, training and tutorials enhance the effective use of technology, ensuring that both students and instructors can maximize digital resources for learning. The availability of appropriate guidelines further supports different types of learners, making technology-based remedial classes more accessible and user-friendly.

This suggests further that a well-structured technical support system contributes to the effectiveness of technology integration in remedial education. By ensuring prompt assistance, clear troubleshooting steps, and ongoing training, technology-based remedial classes can provide a more seamless and efficient learning experience, ultimately improving student engagement and learning outcomes.

TABLE 10. Composite of Technology-Based remedial classes as to Technical Components

Indicators	***Weighted Mean***	***SD***	***Verbal Interpretation***
Accessibility	4.84	0.32	Very Great Extent
Instructional Design	4.86	0.28	Very Great Extent
Usefulness of Technology	4.76	0.40	Very Great Extent
Technical Support	4.86	0.28	Very Great Extent
Grand Mean		**4.83**	
SD		**0.32**	
Verbal Interpretation		**Very Great Extent**	

As shown in Table 10, there is a high level of effectiveness in the technical components of technology-based remedial classes, with a grand mean of M = 4.83, SD = 0.32. This suggests that the integration of technology in remedial education is well-supported in terms of accessibility, instructional design, usefulness, and technical support, ensuring an efficient and engaging learning experience.

There is strong agreement that technology-based remedial classes provide accessible digital tools and platforms, enabling seamless learning for diverse users. The instructional design incorporates adaptive learning strategies and multimedia

resources to enhance student engagement and comprehension. Furthermore, technology is recognized as highly useful in facilitating independent learning, collaboration, and the reinforcement of lessons beyond the classroom. Additionally, the availability of technical support, including troubleshooting guidelines, training, and assistance, ensures that students and instructors can effectively navigate digital platforms without disruptions.

This suggests further that a well-developed technical infrastructure plays a crucial role in the success of technology-based remedial classes. By maintaining high accessibility, structured instructional design, practical technological applications, and reliable technical support, these classes can foster a more inclusive, flexible, and effective learning environment that enhances student performance and engagement.

Level of Students' Academic Skills

In this study, the level of Students' Academic Skills refers to Conceptual Understanding, Data Analysis, Knowledge Acquisition, Scientific Inquiry, and Scientific Reasoning

The following tables show the statement, mean, standard deviation. remarks and verbal interpretation from the perspectives of respondents.

TABLE 11. Level of Students' Academic Skills in terms of Conceptual Understanding

Statements	***Mean***	***SD***	***Remarks***
Scientific concepts are understood and applied accurately in various contexts.	4.86	0.35	Very Good
Scientific vocabulary and terminology are used accurately in discussions and written work.	4.83	0.44	Very Good
Critical thinking is applied when evaluating scientific claims and evidence.	4.86	0.35	Very Good
Understanding of cause-and-effect relationships in scientific phenomena is demonstrated.	4.79	0.41	Very Good
Experiments and investigations are conducted using appropriate scientific methods.	4.90	0.30	Very Good
Weighted Mean	**4.85**		
SD	**0.28**		
Verbal Interpretation	**Very Great Extent**		

As shown in Table 11, there is a high level of conceptual understanding among students, with a grand mean of M = 4.85, SD = 0.28. This suggests that students demonstrate strong comprehension and application of scientific concepts, vocabulary, and reasoning in various contexts.

There is strong agreement that students accurately understand and apply scientific concepts, use precise terminology in discussions and written work, and exhibit critical thinking when evaluating scientific claims and evidence. Additionally, they effectively recognize cause-and-effect relationships in scientific phenomena and conduct experiments using appropriate scientific methods.

This further implies that students' conceptual understanding is well-developed, allowing them to engage in meaningful scientific inquiry, apply knowledge in real-world situations, and enhance their problem-solving skills. A strong foundation in conceptual understanding fosters analytical thinking and academic success, contributing to a deeper appreciation of scientific principles and methodologies.

TABLE 12. Level of Students' Academic Skills in terms of Data Analysis

Statements	***Mean***	***SD***	***Remarks***
Observational skills are effectively used to gather and interpret scientific data.	4.66	0.53	Very Good
Identifies patterns and trends from experimental results accurately.	4.80	0.40	Very Good
Draws logical conclusions based on collected scientific evidence.	0.79	0.54	Very Good
Evaluates the reliability and accuracy of data sources in scientific investigations.	4.66	0.57	Very Good
Uses appropriate scientific terminology when explaining data analysis results.	4.75	0.56	Very Good
Weighted Mean	**4.73**		
SD	**0.41**		
Verbal Interpretation	**Very Great Extent**		

As shown in Table 12, there is a high level of students' academic skills in terms of data analysis, with a grand mean of M = 4.73, SD = 0.41. This indicates that students effectively analyze and interpret scientific data, demonstrating strong observational skills and critical thinking in processing experimental results.

There is strong agreement that students can accurately identify patterns and trends in experimental data, draw logical conclusions based on collected evidence, and evaluate the reliability and accuracy of data sources in scientific investigations. Additionally, they effectively use appropriate scientific terminology when explaining data analysis results, reinforcing their ability to communicate findings accurately.

This further suggests that students possess well-developed data analysis skills, which are essential for scientific inquiry and problem-solving. The ability to analyze data critically enhances their capacity for evidence-based reasoning, enabling them to engage in more complex research and scientific discussions.

TABLE 13. Level of Students' Academic Skills in terms of Knowledge Acquisition

Statements	***Mean***	***SD***	***Remarks***
Applies prior scientific knowledge to new and unfamiliar situations.	4.86	0.35	Very Good
Demonstrates the ability to recall and explain key scientific facts accurately.	4.81	0.39	Very Good
Connects scientific theories to real-world applications and phenomena.	4.75	0.56	Very Good
Uses appropriate scientific vocabulary when discussing concepts and ideas.	4.89	0.36	Very Good
Analyzes and synthesizes scientific information from multiple sources to enhance understanding.	4.89	0.36	Very Good
Weighted Mean	**4.89**		
SD	**0.28**		
Verbal Interpretation	**Very Great Extent**		

As reflected in Table 13, students exhibit a high level of academic skills in terms of knowledge acquisition, with a grand mean of M = 4.89, SD = 0.28. This signifies that students effectively acquire, retain, and apply scientific knowledge across various contexts.

There is a strong consensus that students can recall and explain key scientific facts accurately, apply prior knowledge

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to new and unfamiliar situations, and connect scientific theories to real-world applications. Additionally, they consistently use appropriate scientific vocabulary and analyze information from multiple sources to enhance their understanding.

This further implies that students possess well-developed knowledge acquisition skills, enabling them to engage deeply with scientific concepts, think critically, and integrate learning into practical scenarios. A strong foundation in knowledge acquisition fosters lifelong learning, problem-solving abilities, and a more comprehensive grasp of scientific principles.

TABLE 14. Level of Students' Academic Skills in terms of Scientific Inquiry

Statements	***Mean***	***SD***	***Remarks***
Demonstrates curiosity and problem-solving skills when investigating scientific questions.	4.44	0.63	Very Good
Communicates scientific findings clearly through written reports, presentations, or visual representations.	4.39	0.67	Very Good
Identifies possible sources of error in scientific investigations and suggests improvements.	4.40	0.67	Very Good
Integrates knowledge from multiple scientific disciplines to solve complex problems.	4.63	0.54	Very Good
Engages in collaborative discussions to refine scientific ideas and improve investigations.	4.30	0.72	Very Good
Weighted Mean	**4.43**		
SD	**0.50**		
Verbal Interpretation	**Very Great Extent**		

As indicated in Table 14, students demonstrate a high level of academic skills in terms of scientific inquiry, with a grand mean of M = 4.43, SD = 0.50. This suggests that students actively engage in scientific investigations, problem-solving, and critical analysis when exploring scientific questions.

There is a strong agreement that students exhibit curiosity and problem-solving skills, effectively communicate scientific findings, and identify possible sources of error in their investigations. Additionally, they integrate knowledge from multiple scientific disciplines to address complex problems and engage in collaborative discussions to refine ideas and improve their scientific inquiries.

This further implies that students possess well-developed inquiry skills, which are essential for fostering a scientific mindset and deepening their understanding of research processes. Their ability to analyze, communicate, and collaborate in scientific investigations enhances their capacity for innovation, logical reasoning, and evidence-based decision-making.

TABLE 15. Level of Students' Academic Skills in terms of Scientific Reasoning

Statements	***Mean***	***SD***	***Remarks***
Uses analogies and models to explain scientific concepts and phenomena.	4.70	0.49	Very Good
Critically evaluates alternative explanations for scientific observations.	4.81	0.39	Very Good
Identifies biases and assumptions that may affect scientific interpretations.	4.78	0.50	Very Good
Uses evidence-based reasoning to justify scientific claims and conclusions.	4.73	0.53	Very Good
Applies systematic reasoning to solve complex scientific problems.	4.75	0.52	Very Good
Weighted Mean	**4.75**		
SD	**0.38**		
Verbal Interpretation	**Very Great Extent**		

As shown in Table 15, students exhibit a high level of academic skills in terms of scientific reasoning, with a grand mean of M = 4.75, SD = 0.38. This indicates that students effectively apply logical and evidence-based reasoning in understanding and analyzing scientific concepts and problems.

There is strong agreement that students critically evaluate alternative explanations, identify biases that may affect scientific interpretations, and use systematic reasoning to solve complex scientific problems. Furthermore, they utilize analogies and models to explain scientific phenomena and justify claims based on empirical evidence.

This further suggests that students' ability to think critically and logically strengthens their scientific literacy and problem-solving skills. Their capacity to assess information objectively and draw well-supported conclusions is essential in fostering analytical thinking, innovation, and informed decision-making in scientific and real-world contexts.

TABLE 16. Composite of Students' Academic Skills

Indicators	***Weighted Mean***	***SD***	***Verbal Interpretation***
Conceptual Understanding	4.85	0.28	Very Great Extent
Data Analysis	4.73	0.41	Very Great Extent
Knowledge Acquisition	4.89	0.28	Very Great Extent
Scientific Inquiry	4.43	0.50	Very Great Extent
Scientific Reasoning	4.75	0.38	Very Great Extent
Grand Mean	**4.72**		
SD	**0.37**		
Verbal Interpretation	**Very Great Extent**		

As reflected in Table 15, students demonstrate a high level of academic skills in terms of scientific reasoning, with a grand mean of M = 4.75, SD = 0.38. This signifies that students effectively employ logical and analytical thinking in evaluating scientific concepts, drawing conclusions, and solving problems.

It is evident that students critically assess alternative explanations for scientific observations, recognize biases that may influence interpretations, and utilize evidence-based reasoning to justify claims. Moreover, they apply systematic reasoning to address complex scientific challenges and use analogies and models to explain various scientific phenomena.

This further implies that fostering scientific reasoning skills enhances students' ability to think critically, assess information objectively, and develop sound arguments based on empirical evidence. Strengthening these skills contributes to their overall scientific literacy and equips them with essential competencies for problem-solving and decision-making in both academic and real-world contexts.

As presented in Table 17, there is a high level of students' performance in Science in terms of the Formative Test, with a grand mean of M = 44.50, SD = 4.112. This implies that students generally demonstrated a Satisfactory level of understanding in the subject.

There is a strong indication that the majority of students (86.25%) achieved an Outstanding performance, while 13.75% attained a Very Satisfactory rating. Notably, no students fell under the Satisfactory, Fairly Satisfactory, or Did Not Meet Expectations categories. These results suggest that

students have successfully grasped the concepts assessed in the formative test, indicating the effectiveness of the instructional approach.

TABLE 17. Level of students' performance in Science in terms of Formative Test

Score	Before		Descriptive Equivalent
	f	%	
41 - 50	69	*86.25*	Outstanding
31 - 40	11	*13.75*	Very Satisfactory
21 - 30	0	*0.00*	Satisfactory
11 - 20	0	*0.00*	Fairly Satisfactory
1 - 10	0	*0.00*	Did not meet Expectation
Total	**100**	***100***	
Weighted Mean	*44.50*		
SD	*4.112*		
Verbal Interpretation	*Satisfactory*		

This implies further that the current teaching strategies and interventions are beneficial in enhancing student performance. However, continuous reinforcement, differentiated instruction, and additional support for those in the Very Satisfactory category could further elevate overall student achievement and mastery of scientific concepts.

As presented in Table 18, there is a high level of students' performance in Science in terms of the Summative Test, with a grand mean of M = 44.58, SD = 4.009. This implies that students generally demonstrated a Satisfactory level of understanding in the subject.

The results indicate that the majority of students (85.00%) achieved an Outstanding performance, while 15.00% attained a Very Satisfactory rating. Notably, no students fell under the Satisfactory, Fairly Satisfactory, or Did Not Meet Expectations categories. These findings suggest that students have retained and applied their knowledge effectively in the summative assessment, reflecting the success of the instructional strategies and technology-based remedial interventions.

TABLE 18. Level of students' performance in Science in terms of Summative Test

Score	Before		Descriptive Equivalent
	f	%	
41 - 50	68	*85.00*	Outstanding
31 - 40	12	*15.00*	Very Satisfactory
21 - 30	0	*0.00*	Satisfactory
11 - 20	0	*0.00*	Fairly Satisfactory
1 - 10	0	*0.00*	Did not meet Expectation
Total	**100**	***100***	
Weighted Mean	*44.58*		
SD	*4.009*		
Verbal Interpretation	*Satisfactory*		

TABLE 19. Significant Relationship between the Technology-Based remedial classes as to Teaching Delivery, Technical Components and Students' Academic Skills

Technology-Based remedial classes		Students' Academic Skills				
		Conceptual Understanding	Data Analysis	Knowledge Acquisition	Scientific Inquiry	Scientific Reasoning
Teaching Delivery						
Instructional Delivery	Pearson Correlation	0.2476	0.1587	0.2164	0.2547	0.1685
	Significance (2-Tailed)	0.0000	0.0006	0.0000	0.1805	0.0000
	N	79	79	79	79	79
	Analysis	*Sig*	*Sig*	*Sig*	*Not Sig*	*Sig*
Instructional Quality	Pearson Correlation	0.2980	0.2865	0.2540	0.5304	0.3495
	Significance (2-Tailed)	0.0000	0.0000	0.0000	0.5000	0.0000
	N	79	79	79	79	79
	Analysis	*Sig*	*Sig*	*Sig*	*Not Sig*	*Sig*
Relevance of Content	Pearson Correlation	0.0917	0.1705	0.2325	0.1862	-0.057
	Significance (2-Tailed)	0.0054	0.4470	0.0043	0.0003	0.3197
	N	79	79	79	79	79
	Analysis	*Sig*	*Not Sig*	*Sig*	*Sig*	*Not Sig*
Teaching Flexibility	Pearson Correlation	0.2803	0.2144	0.2479	0.438	0.3273
	Significance (2-Tailed)	0.0000	0.0017	0.0000	0.0230	0.0000
	N	79	79	79	79	79
	Analysis	*Sig*	*Sig*	*Sig*	*Sig*	*Sig*
Technical Components						
Accessibility	Pearson Correlation	0.2581	0.2417	0.3058	0.3258	0.3371
	Significance (2-Tailed)	0.8562	0.0389	1.0000	0.0000	0.0568
	N	79	79	79	79	79
	Analysis	*Not Sig*	*Sig*	*Not Sig*	*Sig*	*Not Sig*
Instructional Design	Pearson Correlation	0.4067	0.3337	0.4057	0.3558	0.4353
	Significance (2-Tailed)	0.7156	0.0073	0.5608	0.0000	0.0089
	N	79	79	79	79	79
	Analysis	*Not Sig*	*Sig*	*Not Sig*	*Sig*	*Sig*
Usefulness of Technology	Pearson Correlation	0.2142	0.3295	0.2290	0.3284	0.3762
	Significance (2-Tailed)	0.0709	0.6373	0.0945	0.0000	0.9186
	N	79	79	79	79	79
	Analysis	*Sig*	*Sig*	*Sig*	*Sig*	*Sig*
Technical Support	Pearson Correlation	0.2904	0.2763	0.3472	0.2938	0.4467
	Significance (2-Tailed)	0.8408	0.0125	0.6756	0.0000	0.0115
	N	79	79	79	79	79
	Analysis	*Sig*	*Sig*	*Sig*	*Sig*	*Sig*

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Correlation Coefficient Value (r)	Direction and Strength of Correlation
0.00 to 0.19	Very Weakly Positive
0.20 to 0.39	Weakly Positive
0.40 to 0.59	Moderately Positive
0.60 to 0.79	Strongly Positive
.80 to 1.00	Perfectly Positive

This further implies that the learning approaches implemented have contributed to students' academic performance. To further enhance their achievement, continuous reinforcement, differentiated instruction, and targeted interventions could be employed, ensuring that all learners reach their full potential in mastering scientific concepts.

Shown in Table 19 is the significant relationship between Technology-Based Remedial Classes in terms of Teaching Delivery and Technical Components and Students' Academic Skills. The results include Pearson correlation coefficients, p-values, and sample size (N=79) for each relationship.

A significant positive relationship was found between Technology-Based Remedial Classes and students' academic skills in conceptual understanding, data analysis, knowledge acquisition, scientific inquiry, and scientific reasoning. Specifically, instructional quality, teaching flexibility, and the usefulness of technology demonstrated strong associations with students' academic performance. Notably, instructional quality and technical support showed the highest correlation, particularly with scientific reasoning and conceptual understanding, emphasizing the role of structured and well-supported technology integration in enhancing students' comprehension and analytical abilities.

The findings also indicate that accessibility and instructional design significantly contribute to scientific inquiry and knowledge acquisition, suggesting that a well-designed digital learning environment fosters deeper understanding and problem-solving skills. However, relevance of content showed a relatively lower correlation with scientific reasoning, implying that additional contextual adaptations may be needed to strengthen students' ability to apply scientific concepts effectively.

Overall, the results emphasize the importance of effective teaching delivery and strong technical support in maximizing the benefits of Technology-Based Remedial Classes. Educators should continue leveraging accessible, interactive, and well-structured digital tools to enhance students' academic skills and engagement across different scientific domains.\

Test of Effect between the Technology-Based remedial classes as to Teaching Delivery, Technical Components and the Students Performance

To test the significant effect between the Technology-Based remedial classes as to Teaching Delivery, Technical Components and the Students Performance they were treated statistically using Real Statistics Data Analysis Tools using the Regression Analysis.

Shown in Table 20 is the significant effect of Technology-Based Remedial Classes on students' performance in relation to Teaching Delivery and Technical Components. The findings indicate that instructional delivery, instructional quality, relevance of content, and teaching flexibility do not significantly affect students' overall performance. Among these, teaching flexibility showed the highest positive impact, but its effect was not statistically significant. This suggests that while structured and adaptive teaching methods support learning, they may not directly determine student performance.

TABLE 20. Significant effect between the Technology-Based remedial classes as to Teaching Delivery, Technical Components and the Students Performance

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.3634	4	6.84085	0.41303	0.79873
	Residual	1242.19	75	16.5625		
	Total	1269.55	79			
a. Dependent Variable: Students Performance_Overall						
b. Predictors: (Constant), Instructional Delivery_Overall, Instructional Quality_Overall, Relevance Of Content_Overall, Teaching Flexibility_Overall						

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	64.2771	7.6766	48.9845	6.38101	0.0000
	INSTRUCTIONAL DELIVERY_OVERALL	2.00749	1.21719	-0.4173	-0.3428	0.7327
	INSTRUCTIONAL QUALITY_OVERALL	1.47942	1.11428	-0.7403	-0.6644	0.50847
	RELEVANCE OF CONTENT_OVERALL	1.0855	1.03608	-0.9785	-0.9444	0.348
	TEACHING FLEXIBILITY_OVERALL	4.03938	1.44192	1.16692	0.80928	0.42091

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.0251	4	14.0063	0.86564	0.48865
	Residual	1213.52	75	16.1803		
	Total	1269.55	79			
a. Dependent Variable: Students Performance_Overall						
b. Predictors: (Constant), Accessibility_Overall, Instructional Design_Overall, Usefulness Of Technology_Overall, Technical Support_Overall						

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	Coefficients[a]					
	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	65.3523	8.26053	48.8965	5.91929	0.0000
	ACCESSIBILITY_OVERALL	11.1049	3.06239	5.00427	1.63411	0.10643
	INSTRUCTIONAL DESIGN_OVERALL	3.14176	3.06834	-2.9707	-0.9682	0.33607
	USEFULNESS OF TECHNOLOGY_OVERALL	3.28158	1.68632	-0.0777	-0.0461	0.96335
	TECHNICAL SUPPORT_OVERALL	6.66199	4.76431	-2.829	-0.5938	0.55444

Similarly, technical aspects such as accessibility, instructional design, usefulness of technology, and technical support did not show a strong impact on students' performance. While accessibility and technical support had relatively higher values, their influence was not significant. These results suggest that while technology-based support enhances learning experiences, other factors may play a more crucial role in academic achievement.

Overall, the findings indicate that teaching delivery and technical components alone may not significantly influence students' overall performance. Further exploration of additional factors, such as student motivation and engagement, may be necessary to fully understand their impact.

IV. Conclusion and Recommendations

On the basis of the foregoing findings, the following conclusion was drawn.

The null hypothesis stating no significant relationship between technology-based remedial classes and students' academic skills is rejected. The results indicate a significant relationship between teaching delivery, technical components, and students' learning outcomes, emphasizing that effective remedial instruction enhances conceptual understanding, data analysis, knowledge acquisition, scientific inquiry, and reasoning.

However, the null hypothesis stating no significant effect of technology-based remedial classes on students' overall academic performance is accepted. The results indicate no statistically significant impact on test scores, suggesting that while remedial instruction improves learning engagement, additional factors may influence measurable academic outcomes.

Despite the positive influence of remedial instruction on students' learning skills, certain areas require further improvement. The study found that student engagement, multimedia integration, and collaborative learning experiences need stronger alignment with instructional design. Additionally, enhancing the practical application of knowledge and experimental learning activities could further improve student performance. These findings reinforce the importance of technology-based remedial instruction in supporting academic skills development while also highlighting the need for targeted interventions to enhance measurable academic performance outcomes.

Based on the drawn conclusions, the following recommendations are proposed:

1. School Administrators should enhance the implementation of technology-based remedial instruction by integrating more interactive learning tools, gamified assessments, and real-world applications to improve student engagement, comprehension, and application of scientific concepts.
2. Teachers should actively participate in continuous professional development programs to enhance their instructional strategies, adaptability to digital platforms, and ability to integrate technology into remedial classes effectively. They should also focus on collaborative learning techniques to strengthen scientific inquiry and reasoning.
3. Educational Institutions should invest in improving the technical components of remedial programs by enhancing accessibility, instructional design, and technical support services. This includes ensuring that learning platforms are user-friendly, multimedia resources are interactive, and AI-driven learning analytics provide real-time feedback for student progress monitoring.

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