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Science Technology and Engineering (STE) Program in the Province of Ilocos Sur

Ramil R. Flores

Narvacan National Central High School, Narvacan, Ilocos Sur, Philippines

ABSTRACT: This study explored the extent of implementation of the Science, Technology, and Engineering (STE) Program in public secondary schools across the province of Ilocos Sur. Using a quantitative research design, the study assessed key areas including Admission and Retention, Curriculum and Instruction, Program Management, Monitoring and Evaluation, and the adequacy of learning resources. Data were collected through validated survey questionnaires administered to 50 school administrators, 197 teachers, and 317 students. Findings revealed that the STE Program was perceived as "very much implemented" by administrators and teachers across most domains, with students generally agreeing but with slightly lower ratings, particularly in monitoring and evaluation. Learning resources were rated as "very adequate," although gaps remained in access to specialized tools like robotics kits and advanced science equipment. Significant differences were found among the perceptions of stakeholders in Admission and Retention, Curriculum and Instruction, and Program Management, but not in Monitoring and Evaluation. The study highlights the importance of sustained stakeholder engagement, enhanced resource provision, and alignment of perceptions to further strengthen the STE Program's delivery and impact.

KEYWORDS: Science, Technology and Engineering Program, Implementation, Adequacy of Resources, Challenges, Administrators, Teachers

INTRODUCTION

In today's rapidly evolving global landscape, the importance of scientific literacy cannot be overstated. The ability to think critically, solve complex problems, and innovate is essential for nations striving to stay competitive in the 21st century. Education systems around the world have increasingly prioritized science, technology, engineering, and mathematics (STEM) education to prepare students for a future shaped by technological advancements, climate change, and global health challenges (World Economic Forum, 2020).

The Philippines, through the Department of Education (DepEd), responded to the global call for stronger STEM education by establishing the Science, Technology, and Engineering (STE) Program under DepEd Order No. 55, s. 2010. The STE Program is designed to nurture scientifically inclined students by equipping them with advanced knowledge and skills in science, mathematics, and research. It aims to develop their capacity to become globally competitive, work-ready, and environmentally responsible citizens. Envisioned to provide a rigorous academic environment, the program emphasizes research-based instruction that fosters critical thinking, inquiry, and innovation.

Despite the establishment of the STE Program, significant challenges persist in fully achieving its objectives, particularly in ensuring equitable access to quality science education across the country. International assessments, such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS), consistently reveal that Filipino students perform below global standards in science and mathematics. Persistent resource limitations, curriculum inconsistencies, and disparities in teacher training continue to hinder the effective delivery of the STE Program nationwide.

Several studies have highlighted that the implementation of STE programs in the Philippines faces substantial barriers that affect the quality and accessibility of science education. Resource shortages—including the lack of laboratories, modern equipment, and learning materials—are particularly acute in underserved regions. The Department of Education (DepEd, 2022) reports that funding constraints limit the ability of schools to provide the hands-on experiences essential to effective STE learning. Furthermore, teacher training remains a critical issue, with many educators lacking specialized expertise in advanced science and technology, especially in rural areas where access to professional development resources is limited (Philippine Institute for Development Studies, 2023). These challenges result in uneven program quality across different regions.

While various national studies have examined the extent of STE Program implementation, there is a noticeable gap in research specifically focused on its implementation in the province of Ilocos Sur. To address this gap, this study was undertaken to explore the extent of the Science, Technology, and Engineering (STE) Program's implementation in Ilocos Sur. The findings of this research are expected to provide valuable insights and serve as a basis for enhancing the delivery of STE education in the province.

METHODOLOGY

This study employed a phenomenological research design to explore the lived experiences of Grade 1 to 3 teachers in implementing Mother Tongue Based-Multilingual Education (MTB-MLE) in the Schools Division of Ilocos Sur and Candon City, aiming to describe the commonalities of their experiences with language barriers in the classroom (Creswell & Poth, 2018). Using purposive sampling, the researchers selected participants who were actively teaching MTB-MLE and had firsthand experience with the associated challenges and strategies, specifically targeting those from Ilocos Sur and Candon City (Grove & Gray, 2019). Data collection involved an interview guide questionnaire, participant orientation, obtaining written consent, and conducting interviews in a comfortable, undisturbed setting, with all interviews recorded, transcribed, and verified by participants. Thematic analysis, a method used to identify, analyze, and interpret patterns within the data, was employed, involving steps such as data familiarization, coding, theme development, and iterative refinement to ensure coherence and representation of the data (Creswell & Creswell, 2023). Ethical considerations included ensuring participant privacy and informed consent, with names withheld to guarantee anonymity, and the relevance of their contributions was clarified to highlight their significance to the research. This design, grounded in phenomenology, effectively captures the nuanced and subjective experiences of teachers, revealing the complexities and practical realities of implementing MTB-MLE in a multilingual context (Moustakas, 1994; Van Manen, 1990).

RESULTS AND DISCUSSION

Extent of Implementation of the Science, Technology, and Engineering (STE) Program as Perceived by the School Administrators, Teachers and Students

Table 1 presents the extent of implementation of the Science, Technology, and Engineering (STE) Program as perceived by the school administrators, teachers and students in terms of Admission and Retention.

It can be seen in the table that administrators and teachers very much implemented in terms of admission and retention with an overall mean of 4.60 and 4.53, respectively. Meanwhile, students generally identified that it is much implemented with an overall mean of 4.04. This indicates that administrators and teachers are very well versed in the processes of admission and retention, likely due to their familiarity with the program's qualification criteria. These findings are corroborated by a 2024 study conducted in the Division of Rizal, which revealed that both teachers and school heads highly rated the implementation of the Special Science Curriculum (SSC)—a program aligned with STE—particularly in terms of adherence to admission and retention guidelines (De la Cruz, 2024). Furthermore, the Department of Education (DepEd) has consistently issued detailed guidelines to standardize the admission and retention process, such as Division Memorandum No. 129, s. 2020, and more recent directives including SDM No. 120, s. 2024, and SDM No. 054, s. 2025 (Department of Education, 2020, 2024, 2025).

While students rated the implementation slightly lower, their generally positive feedback indicates that the program is effectively delivered at the learner level. The national emphasis on the STE program's role is also highlighted by the Second Congressional Commission on Education (EDCOM 2), which noted the need to expand support for science-focused learners beyond the current 1% reach (EDCOM 2, 2024).

This implies that the admission guidelines are being followed effectively, but there is room for enhancement in the retention process, especially concerning probationary measures for struggling students. Notably, the study of Salandanan & Garcia (2021) underscores the importance of structured retention policies in specialized programs like STE to ensure student success. School administrators are encouraged to reinforce their retention strategies to support learners who may face academic challenges, ensuring they meet program standards while maximizing their potential in the STE curriculum.

Table 1. Extent of Implementation of the Science, Technology, and Engineering (STE) Program as Perceived by the School Administrators, Teachers and Students in Terms of Admission and Retention.

Indicators	Admin		Teachers		Students	
	$\bar{x}$	DR	$\bar{x}$	DR	$\bar{x}$	DR
1. Preliminary selection is being conducted through documentary evaluation to assess the readiness /qualification of applicants based on the basic requirements as follows: a. PSA / NSO Birth Certificate b. Certificate of Good Moral Character c. Medical Certification d. School Form 9 (PROFICIENT level (85%-89%) in Science, Mathematics, English and the special subject/s and at least APPROACHING PROFICIENCY (80%- 84%) in other subjects) e. Referrals and other relevant certifications.	**~~4.84~~**	**VMI**	**4.79**	**VMI**	**4.40**	**VMI**
2. An interview of the applicant, together with the parent/ guardian, is being undertaken to validate the documents submitted and to gauge the possibility of the applicant to succeed in the program.	**4.90**	**VMI**	**4.83**	**VMI**	**4.09**	**MI**
3. The Administration of High School Occupation and Interest Inventory (HSOII) and aptitude test is under the supervision of the Regional Supervisor in charge of the special program in Science, Technology and Engineering.	**4.70**	**VMI**	**4.74**	**VMI**	**4.20**	**MI**
4. A learner is being promoted if he/she attains PROFICIENT level (85%-89%) in Science, Mathematics and the special subject/s and At least APPROACHING PROFICIENCY (80%- 84%) in other subjects.	**4.74**	**VMI**	**4.68**	**VMI**	**4.10**	**MI**
5. A learner is retained in the program if he/she attains a PROFICIENT level in Science, Mathematics and the special subject/s and at least APPROACHING PROFICIENCY in other subjects.	**4.62**	**VMI**	**4.50**	**VMI**	**4.33**	**VMI**
6. A learner is on probation for a period of one (1) year if he / she fails to meet the required levels of proficiency.	**3.74**	**MI**	**3.76**	**MI**	**3.29**	**MoI**
7. A learner is accepted automatically to a regular curricular program in the next school year without subject deficiency if he / she fails to meet the abovementioned levels of proficiency within the probation period.	**4.58**	**VMI**	**4.45**	**VMI**	**3.71**	**MI**
8. A learner is allowed to transfer to another school offering the same program, provided he/she has maintained the required level of proficiency.	**4.68**	**VMI**	**4.65**	**VMI**	**4.32**	**VMI**
9. A learner from the special program is allowed to transfer to a regular curricular program without subject deficiency.	**4.59**	**VMI**	**4.50**	**VMI**	**3.86**	**MI**
10. A learner from a regular curricular program is allowed to transfer to the special program, provided the requirements in the special program have been met.	**4.60**	**VMI**	**4.44**	**VMI**	**4.09**	**MI**
OVERALL MEAN	**4.60**	**VMI**	**4.53**	**VMI**	**4.04**	**MI**

Legend: 4.21 – 5:00 – Very Much Implemented (VMI)
3.41 – 4.20 – Much Implemented (MI)

Moreover, the conduct of preliminary selection through documentary evaluation garnered the highest overall mean scores: 4.84 for administrators, 4.79 for teachers, and 4.40 for students. This suggests that administrators and teachers perceive the documentary evaluation process as very much implemented, likely due to their familiarity with the criteria and standards involved. In contrast, students rated this aspect slightly lower, possibly because they are the subjects of the evaluation rather than the evaluators. The Department of Education (DepEd) has established guidelines for the preparation and checking of school forms to ensure the accuracy and reliability of student records, which are crucial during admission and retention processes (DepEd, 2018). Additionally, De la Cruz (2024) emphasized the importance of thorough documentary evaluation in the implementation of the Special Science Curriculum, highlighting that meticulous assessment of student records is vital for maintaining program standards.

This implies that relying solely on documentary evaluation for preliminary selection might inadvertently create a bias favoring some students. Such evaluation methods often emphasize academic achievements and the completeness of documents, which may advantage students with greater access to resources, structured academic support, or awareness of documentation standards. This can lead to an overrepresentation of students who are more privileged in the selection process, even when others may demonstrate equal or greater potential in non-documented areas such as creativity, leadership, or resilience (Panorama Education, 2024). De la Cruz (2024) noted that while documentary evaluation plays a crucial role in the Special Science Curriculum's admission process, it may not fully capture holistic learner attributes that go beyond academic records. Moreover, findings from the broader discourse on admissions bias, such as the Students for Fair Admissions v. Harvard case, underscore the limitations of relying heavily on documentation and test scores, highlighting the need for more inclusive and diverse criteria in evaluating student capability (Students for Fair Admissions v. Harvard, 2025).

Meanwhile, the probationary period for learners who fail to meet the required proficiency level received the lowest rating, with an overall mean of 3.74 for administrators, 3.76 for teachers, and 3.29 for students. This infer that probationary students who fail to attain the required competency levels are seen adversely by all levels of the educational institution. Students may endure the stress and possible stigma of being on probation, teachers may perceive it as an increase in burden and a reflection on their teaching, and administrators probably see it as an indication of possible problems with the curriculum or quality of education. Thus, from the viewpoints of administrators, teachers, and the students themselves, a large proportion of probationary students is a negative reflection on the educational process as a whole. Recent studies support this concern, emphasizing how traditional academic probation systems often induce negative psychological effects. Research by Brady et al. (2022) found that students placed on probation frequently experience shame, stigma, and reduced academic engagement. Furthermore, Bellows (2024) reported that an increasing number of colleges are moving away from the punitive language and structures of academic probation, recognizing that these practices can discourage students rather than motivate them. Psychologically attuned interventions, such as reframed probation letters that emphasize growth and support, have been shown to reduce dropout rates and improve student outcomes (Brady et al., 2022). These findings reinforce the need for supportive and holistic academic policies that view probation as a developmental phase rather than a mark of failure.

As a result of it, various shared concern across learning institutions regarding students not meeting proficiency standards. The negative perception from administrators suggests a potential need for systemic review, while teachers' increased burden highlights the need for support and resources for struggling learners. Ultimately, a high number of probationary students signals a potential gap in the educational system's ability to effectively support all learners in achieving the required competencies. This concern is supported by recent findings from the American Institutes for Research (AIR), which emphasized that high rates of students not meeting academic standards often stem from broader systemic issues, such as inequitable resource distribution, curriculum misalignment, and insufficient student support services (Lacireno-Paquet et al., 2022). These findings highlight the importance of institution-wide interventions aimed at not only identifying struggling students but also improving instructional strategies and school-wide systems to better meet diverse learning needs.

On Curriculum and Instruction

Table 2 shows that the STE program along curriculum and instruction is very much implemented by the of administrators, teachers, and students, with overall ratings of 4.82, 4.72, 4.32, respectively. This means that there is strong adherence to the STE program's curriculum guidelines and teaching standards which indicates that administrators, teachers, and students are actively implementing the curriculum and instruction of the Science, Technology, and Engineering (STE) program. Teachers are delivering the curriculum and instruction in the classroom, students are actively participating in the learning activities, and administrators are probably giving the program the support and resources it needs. The school community's broad acceptance and participation in the STE program is suggested by this cooperative implementation. This observation is corroborated by a study conducted in Region XII, Philippines, which evaluated the responsiveness of the STE program. The study found that both administrators and teachers rated the program as "very highly responsive" in terms of curriculum implementation and instructional programs. Students also reported a "high extent of learning opportunities" from the program's implementation.

These findings imply that schools have been consistently meeting the requirements and standards of the STE curriculum, reflecting a successful and collaborative effort among educators, administrators, and students (Macaranas & Robles, 2023).

Table 2. Extent of Implementation of the Science, Technology, and Engineering (STE) Program as Perceived by the School Administrators, Teachers and Students in Terms of Curriculum and Instruction.

Indicators	Admin		Teachers		Students	
	$\bar{x}$	DR	$\bar{x}$	DR	$\bar{x}$	DR
1. The program has a separate set of honors, provided that the number of graduating students is within the limits of the national averages for completion and drop-out rates.	**4.67**	**VMI**	**4.66**	**VMI**	**4.17**	**VMI**
2. Other policies pertaining to the selection of honors are being drawn from the guidelines on the selection and recognition of honors of Grades 1 to 10 of the K to 12 Basic Education Curriculum as stipulated in relevant and most recent DepEd Order/Issuance.	**4.80**	**VMI**	**4.77**	**VMI**	**4.29**	**VMI**
3. Assessment and rating system follow the guidelines as prescribed in the General Guidelines for the Assessment and Rating of Learning Outcomes.	**4.88**	**VMI**	**4.77**	**VMI**	**4.42**	**VMI**
4. The assessment employs holistic and standards-based assessment where the attainment of standards plays an important role in gathering evidence of learning.	**4.90**	**VMI**	**4.77**	**VMI**	**4.31**	**VMI**
5.The class is being handled by teachers whose qualifications include a degree/certification in his/her area of specialization who are guided by appropriate educational pedagogies and principles involving current trends and strategies in teaching and learning.	**4.84**	**VMI**	**4.60**	**VMI**	**4.55**	**VMI**
Sub Mean	**4.82**	**VMI**	**4.72**	**VMI**	**4.32**	**VMI**

Legend: 4.21 – 5:00 – Very Much Implemented (VMI)

This suggests that the STE program is probably well-integrated into the school's curriculum, with support and involvement from all implementers. This proactive implementation shows that the schools is dedicated to STEM education. The collaborative aspect also suggests that the program may be beneficial for students' interest in science, technology, and engineering as well as for the program's efficacy. This is corroborated by Ortega and Chua (2024), who conducted a strategic impact assessment of the revitalized STE program in selected public junior high schools in the Philippines. Their findings revealed a strong alignment between curriculum implementation and positive student attitudes toward science, as well as high satisfaction levels among teachers and administrators regarding instructional delivery and support mechanisms. The study highlighted that collaboration among all stakeholders significantly contributed to the program's effectiveness, student engagement, and the overall success of STEM integration in public education.

On the other hand, it can be seen in the table that that the assessment employs holistic and standards-based assessment where the attainment of standards plays an important role in gathering evidence of learning is perceived the highest by the administrators, teachers and students and was described as very much implemented, with the overall mean of 4.90, 4.77, and 4.31, respectively. This infers that administrators, educators, and students all strongly concur that the methods of assessment employed are comprehensive and standards-based, and that meeting learning objectives is a crucial component of gathering data on students' development. It also shows a strong belief that this method of assessment is regularly and successfully used in this school environment. This is corroborated by Sortwell et al. (2024), whose systematic review found that formative and standards-based assessments significantly enhance student learning outcomes by aligning evaluation tools with instructional goals, providing constructive feedback, and fostering student engagement. Their findings support the claim that such assessment practices, when well-integrated, contribute meaningfully to educational quality and learner development.

With previous claim, it is strongly agreed that there is shared understanding and acceptance of the assessment system's principles and practices among all stakeholders. It suggests that the assessment is likely perceived as fair, relevant, and aligned with the intended learning outcomes. This consensus can foster greater trust in the assessment results and promote a more unified approach to teaching and learning, with a clear focus on achieving established standards. This is supported by the findings from the National Education Association (2021) which highlights the importance of stakeholder collaboration in developing equitable and culturally responsive assessments. Similarly, research by Xu and Brown (2023) shows that transparent, consistent practices foster trust and strengthen standards-focused learning environments.

Meanwhile, the indicator "The program has a separate set of honors, provided that the number of graduating students is within the limits of the national averages for completion and drop-out rates" received the lowest rating, with a mean of 4.67 for administrators, 4.66 for teachers, and 4.17 for students.

However, the slightly lower rating on honors and recognition policies suggests that there may be a need for further clarification and dissemination of relevant DepEd orders to ensure consistency in implementation.

The results suggest that while the implementation of curriculum and instruction in the STE program is highly regarded, there are areas that may require further enhancement, particularly in terms of policies on academic recognition.

Notably, the study of Bernardo et al. (2021) highlights the significance of a well-defined curriculum and assessment system in specialized programs like STE, emphasizing that clear guidelines on assessment, instruction, and academic recognition enhance students' motivation and learning outcomes. Administrators and teachers are encouraged to continuously refine instructional strategies and assessment practices to maintain the integrity and effectiveness of the STE program.

On Program and Management

Table 3. Extent of Implementation of the Science, Technology, and Engineering (STE) Program as Perceived by the School Administrators, Teachers and Students in Terms of Program and Management

Indicator	Admin		Teachers		Students	
	$\bar{x}$	DR	$\bar{x}$	DR	$\bar{x}$	DR
1. The program is being managed by the School Head assisted by the Science Program Coordinator/Department Head who is preferably a specialist.	**4.88**	**VMI**	**4.78**	**VMI**	**4.81**	**VMI**
2. Sustainability of the program is being achieved in coordination with the School Governing Council (SGC) where the Science Program Coordinator/Department Head sits as member.	**4.74**	**VMI**	**4.95**	**VMI**	**4.51**	**VMI**
3. As part of the responsibility of the Division Office in the management of the program, it performs supervisory functions to ensure that the implementation is within the standards set by the program.	**4.9**	**VMI**	**4.59**	**VMI**	**4.27**	**VMI**
4. The overall management of the program falls under the responsibility of the Regional Office.	**4.7**	**VMI**	**4.60**	**VMI**	**4.18**	**MI**
5. The development of policies and guidelines for the implementation of the program is the responsibility of the Central Office.	**4.86**	**VMI**	**4.69**	**VMI**	**4.24**	**VMI**
OVERALL MEAN	**4.82**	**VMI**	**4.72**	**VMI**	**4.40**	**VMI**

Legend: 4.21 – 5.00 – Very Much Implemented (VMI)
3.41 – 4.20 – Much Implemented (MI)

The results reveals that the STE program in terms of program and management is very much implemented by the administrators, teachers, and students, with overall mean ratings of 4.82, 4.72, and 4.40, respectively. This indicates a strong level of program execution across all stakeholder groups, reflecting consistent efforts to manage and sustain the program in line with its intended goals. School administrators are seen to be actively managing the program with leadership and policy guidance, teachers are collaborating in its implementation, and students recognize its organized structure and support. This shared perception underscores the effectiveness of the management system in place and the school community's unified engagement in sustaining the STE program. This observation is consistent with broader findings in educational leadership and program implementation literature. Effective school leadership is widely recognized as a key driver of program success, as noted by Leithwood et al. (2020) and Dike & Hossain (2023), who emphasize the importance of visionary leadership, strategic resource allocation, and clear policy direction in ensuring sustainable implementation. Additionally, the reported collaboration among teachers in carrying out the STE program aligns with the role of professional collaboration in enhancing STEM education outcomes, as highlighted by the National Academies of Sciences, Engineering, and Medicine (2022) and by Çepni & Bacanak (2020). Student acknowledgment of structured program management and support further indicates effective implementation. Such recognition is linked to increased student engagement and academic success, as emphasized in the National Curriculum Framework for School Education 2023 (NCERT, 2023) and the Academic Supervision Manual of the Dinajpur Education Board (2021). Altogether, this shared positive perception among administrators, teachers, and students underscores the effectiveness of the management system and the unified commitment of the school community to sustaining the STE program reflecting the hallmarks of a well-executed educational initiative.

This implies a robust and well-functioning STE program where all key players are actively contributing to its success. The alignment between administrative oversight, teacher collaboration, and positive student perception suggests a strong foundation for continued program growth and achievement of its objectives. This unified engagement fosters a supportive learning environment and increases the likelihood of positive outcomes for students in science, technology, and engineering. This implies a robust and well-functioning STE program where all key players are actively contributing to its success. The alignment between administrative oversight, teacher collaboration, and positive student perception suggests a strong foundation for continued program growth and achievement of its objectives. This unified engagement fosters a supportive learning environment and increases the likelihood of positive outcomes for students in science, technology, and engineering. This is supported by the National Academies of Sciences, Engineering, and Medicine (2022), which emphasized that successful STEM programs are characterized by cohesive leadership, teacher preparedness, and active student involvement, all of which contribute to enhanced educational outcomes and long-term interest in STEM fields. Additionally, research by Geiger et al. (2023), emphasized that strong instructional leadership and collaborative engagement among school stakeholders are key drivers in the successful implementation of STEM initiatives. Their study highlighted that when school leaders align institutional goals with STEM frameworks and foster teacher empowerment and student engagement, STEM programs are more likely to be effective and sustainable.

Specifically, the table shows that the program is being managed by the School Head assisted by the Science Program Coordinator/Department Head who is preferably a specialist received the highest ratings from administrators (4.88), teachers (4.78), and students (4.81). This shows that a very high degree of agreement exists among administrators, teachers, and students regarding the effectiveness of the program's present management structure, which is headed by the school head with the help of a department head or specialty science program coordinator. Across all stakeholder groups, the ratings are consistently high (Very Much Implemented, or VMI), indicating significant confidence in this leadership paradigm for the program's success. This widespread favorable opinion suggests that the entire school community values and acknowledges the competence and teamwork in running the program. This finding is supported by Geiger et al. (2023), who emphasized that effective leadership particularly in STEM education requires strategic coordination, clear role distribution, and active engagement from program heads to sustain successful implementation. Similarly, the Wallace Foundation (2023) found that strong school leadership significantly contributes to better student outcomes, teacher retention, and overall program performance, reinforcing that high stakeholder confidence in leadership correlates with improved school-wide success.

The consistently high ratings from administrators, teachers, and students imply that the program's management is both trusted and effective across all stakeholder groups. This suggests a strong foundation for long-term sustainability and a shared commitment to the goals of the STE program. When school leadership is perceived as competent and collaborative, it enhances overall program performance and promotes a unified, purpose-driven learning environment. This is supported by Leithwood et al. (2023), whose study affirms that effective and distributed school leadership positively influences student learning outcomes, strengthens program implementation, and fosters a collective sense of purpose within schools.

Meanwhile, the overall management of the program falls under the responsibility of the Regional Office received the lowest rating, with an overall mean of 4.70 for administrators, 3.60 for teachers, and 4.18 for students. The relatively low rating from teachers may reflect their limited interaction with or awareness of the Regional Office's direct involvement in day-to-day program operations. Administrators, who typically communicate more closely with regional authorities, may better understand the strategic oversight role of the Regional Office, hence their higher ratings. Students, on the other hand, may have minimal exposure to regional-level governance, leading to a moderate perception shaped more by indirect experiences. This suggests a potential disconnect between policy oversight and grassroots implementation, which could affect how well the goals of the program are communicated and executed at the school level. A study by Cabillo-Jimenez (2021) highlights that educators' perceptions of program effectiveness are closely tied to how well oversight bodies communicate and engage with them. When regional authorities are not clearly seen or heard by stakeholders, trust and alignment may weaken, impacting the consistency and quality of implementation. Therefore, improved transparency and communication from the Regional Office may strengthen the connection between governance and classroom practice, promoting a more unified and effective STE program implementation.

The lower perception of the Regional Office's role, especially from teachers, implies a potential gap in communication or visibility of governance support at the regional level. This suggests the need for improved dissemination of information, recognition of regional initiatives, and increased teacher engagement in regional consultations to strengthen the sense of alignment and trust. Enhancing this relationship may lead to more cohesive program implementation across all levels of the education system. This aligns with the findings of Çaybaş and Ordu (2023), who emphasized that strong administrative leadership, especially when marked by clear communication and collaborative practices, fosters stakeholder confidence and significantly contributes to the success of school programs.

On Monitoring and Evaluation

Table 4. Extent of Implementation of the Science, Technology, and Engineering Program as Perceived by the School Administrators, Teachers and Students in Terms of Monitoring and Evaluation.

Indicator	Admin		Teachers		Students	
	$\bar{x}$	DR	$\bar{x}$	DR	$\bar{x}$	DR
1. The Division Office conducts progress monitoring of the implementation of the different activities of the program including the utilization of the subsidy as part of its regular activities.	**4.58**	**VMI**	**4.28**	**VMI**	**4.38**	**MI**
2. The Regional Office is responsible in the overall managing of the program, determining program impact and identifying best practices in program implementation.	**4.58**	**VMI**	**4.31**	**VMI**	**4.14**	**MI**
3, Technology and Engineering 3. A composite task force from the Central, Regional, and Division Offices conducts regular evaluation of program implementation.	**4.66**	**VMI**	**4.17**	**MI**	**4.07**	**MI**
OVERALL MEAN	**4.61**	**VMI**	**4.25**	**VMI**	**4.20**	**MI**

Legend: 4.21 – 5.00 – Very Much Implemented (VMI)
3.41 – 4.20 – Much Implemented (MI)

The results revealed that school administrators scored an overall mean of 4.61 (VMI), teachers scored 4.25 (VMI), and students scored 4.20 (MI), indicating a Very Much Implemented rating as perceived by administrators and teachers, while students see it as Much Implemented but with room for improvement. This suggests that school administrators and teachers are highly aware of the program's monitoring activities conducted by the Division, Regional, and Central Offices. Their high ratings reflect strong alignment with the protocols for tracking the program's implementation, including subsidy utilization, documentation of best practices, and overall program impact evaluation. On the other hand, students gave the lowest rating among the three groups, perceiving the implementation as only "much implemented." This could be attributed to the fact that students are less directly involved in or exposed to the processes of program evaluation, particularly those coordinated at regional or national levels. This result is supported by the Department of Education's Basic Education Monitoring and Evaluation Framework (BEMEF), which mandates active participation of school heads and teachers in ensuring the fidelity of program implementation across all governance levels (Department of Education, 2020).

This implies that the monitoring and evaluation activities of the STE program are being conducted effectively at the administrative and teacher levels, but there is room for improvement in student engagement with the evaluation process. While administrators and teachers rated the program's monitoring mechanisms highly, students rated it lower, indicating a need for more inclusive communication and involvement in the evaluation activities. This result is supported by the study of Bautista and Quimbo (2021), which highlights the importance of involving students in the evaluation process to enhance their understanding of how feedback shapes their learning. School administrators are encouraged to further involve students in feedback mechanisms and provide them with clearer insights into how their input contributes to the program's improvement, ensuring that students feel more connected to the evaluation process and empowered to take an active role in their learning journey.

Moreover, the implementation of the monitoring and evaluation of the STE program, particularly in terms of the Division Office's progress monitoring activities, received high overall mean scores: 4.58 for administrators, 4.28 for teachers, and 4.38 for students. This suggests that both administrators and teachers perceive the monitoring process as very much implemented, likely due to their direct involvement in overseeing and managing the program's activities. In contrast, students rated this aspect slightly lower, possibly because they are less directly engaged in the monitoring and evaluation processes, particularly those managed at higher levels like the Division or Regional Offices. The Department of Education's Basic Education Monitoring and Evaluation Framework (BEMEF) encourages active participation of school heads and teachers in the implementation and oversight of the program's progress, ensuring fidelity and alignment with program goals (TeacherPH, 2020). Furthermore, Sortwell et al. (2024) found that effective program monitoring and evaluation contribute to transparency and accountability, which leads to enhanced program quality and student engagement.

This implies that while the monitoring and evaluation activities of the Division Office are seen as very much implemented by administrators and teachers, the slight difference in student perception suggests that their involvement in these processes may be limited. The evaluation system, though robust, may unintentionally favor stakeholders who are directly engaged with the processes, such as administrators and teachers, and may not fully address the student perspective. This can create a potential bias in how the effectiveness and impact of the program are perceived, as students who are less involved in the monitoring process may feel disconnected from or unaware of how evaluations influence their learning experience. This aligns with the research which shows that evaluation systems often favor stakeholders directly engaged in the process, such as administrators and teachers, which can unintentionally exclude student voices and create a disconnect in how evaluations influence their learning experience (Edinburgh Research Archive, 2020; Explorance, 2020). Further, increasing student participation in monitoring and evaluation not only empowers them as active contributors but also helps reduce bias by ensuring that diverse perspectives are included, leading to a more balanced and accurate understanding of program effectiveness (Syracuse University, 2024).

The findings indicate that monitoring and evaluation structures are well-established, ensuring adherence to program guidelines and effective implementation of STE initiatives. However, the lower student rating suggests a need to enhance the visibility and communication of monitoring efforts at the regional level to better inform students about its role and impact. According to OECD (2021), effective monitoring and evaluation in specialized education programs, such as STEM-focused curricula, require transparent communication among all stakeholders, including students, to foster engagement and program ownership. Similarly, Zhao et al. (2023) emphasize the importance of student participation in feedback mechanisms to refine and improve program delivery. Strengthening student awareness and involvement in the evaluation process may further enhance the effectiveness of the STE program, ensuring continuous improvement and alignment with the needs of all stakeholders.

Table 5. Level of Adequacy of Learning Resources and Facilities in the Science, Technology, and Engineering (STE) Program as Perceived by the School Administrators, Teachers and Students

	Admin		**Teachers**		**Students**	
	$\bar{x}$	**DR**	$\bar{x}$	**DR**	$\bar{x}$	**DR**
1. The school has a functional Science laboratory.	**3.56**	**VA**	**3.79**	**VA**	**3.55**	**VA**
2. The school has a functional library with enough resources for research and reference purposes.	**3.88**	**VA**	**3.83**	**VA**	**3.98**	**VA**
3. The school has a Science laboratory equipped with laboratory tools and equipment (equipped with laboratory resources (instruments/equipment/chemicals/reagents) that complement the curriculum).	**3.92**	**VA**	**3.98**	**VA**	**3.75**	**VA**
4. The school has available projectors/LCD TVs and	**4.38**	**FA**	**4.49**	**FA**	**4.30**	**FA**

other ICT- related materials in the classrooms.						
5. The school has available computers with installed coding platforms.	**3.92**	**VA**	**4.07**	**VA**	**4.06**	**VA**
6. The school has available robotics, simple machines and electronic kits.	**3.40**	**A**	**3.43**	**VA**	**3.43**	**VA**
7. The school has available computers with installed simulation and modelling software; CAD Software, Data Analysis Software and Augmented and Virtual Reality Applications.	**3.52**	**VA**	**3.63**	**VA**	**3.67**	**VA**
8. The school has sufficient tools for Science Investigatory Projects (SIPs).	**3.62**	**VA**	**3.70**	**VA**	**3.75**	**VA**
OVERALL MEAN	**3.78**	**VA**	**3.86**	**VA**	**3.81**	**VA**

Legend: 4.21 – 5.00 – Fully Adequate (FA)
3.41 – 4.21 – Very Adequate (VA)

It can be seen from the table that administrators, teachers, and students perceive the level of adequacy of resources as Very Adequate as manifested in the overall mean rating of 3.78 and 3.86, 3.81 respectively. This could be attributed to the fact that these learning resources and facilities are preliminary requirement in the offering of the STE Program. This aligns with the DepEd Order No. 55, s. 2010, which mandates essential facilities such as science laboratories and ICT tools as prerequisites for STE program implementation which are foundational to delivering the enriched curriculum effectively.

Moreover, the school has available projectors/LCD TVs and other ICT-related materials in the classrooms received the highest overall mean of 4.38 (FA) for administrators, 4.49 (FA) for teachers, and 4.30 (FA) for students, indicating that ICT resources for instruction are fully adequate across all groups. This can be attributed to the growing emphasis on digital integration in education and the schools' prioritization of technology in instructional delivery. This observation aligns with the Department of Education's (DepEd) Digital Rise Program, which emphasizes the integration of ICT in basic education to enhance learning and teaching processes through the provision of digital tools and infrastructure (DepEd, 2021). Additionally, UNESCO (2022) highlights that technology-enabled learning environments promote innovation, improve learning outcomes, and ensure inclusivity in 21st-century classrooms.

On the other hand, the school has available robotics, simple machines, and electronic kits received the lowest mean of 3.40 (A) for administrators, 3.43 (VA) for teachers, and 3.43 (VA) for students, suggesting a lack of specialized equipment to support hands-on learning in engineering and technology-related activities. This relatively lower rating may be due to the high cost and limited availability of robotics kits and engineering tools, which require substantial investment from schools. This finding is supported by a report from the Department of Education and UNESCO (2022), which highlighted that while efforts have been made to integrate STEM in Philippine education, access to advanced technological equipment such as robotics kits remains a challenge due to budget constraints and procurement limitations. Similarly, according to the SEAMEO INNOTECH 2021 policy brief, many public secondary schools in the Philippines still lack adequate funding and infrastructure to support high-end STEM facilities, affecting the implementation of specialized components like robotics and engineering kits.

These results suggest that while the school has successfully provided ICT-related teaching tools and basic laboratory resources, further investment in robotics, engineering kits, and advanced science equipment is necessary to fully support STE learners and ensure a more holistic implementation of the program. This is supported by Zhou et al. (2020), who emphasized that modern STEM education requires access to hands-on, integrative technologies such as robotics and engineering kits to foster critical thinking, innovation, and problem-solving among learners.

Table 6. Difference on the Extent of Implementation of STE Program as Perceived by School Administrators, Teachers and Students

DOMAIN		SS	dF	MS	F	Sig.
Admission and Retention	Between groups	35.838	2	17.919		
	Within groups	174.012	561	0.310	57.770	0.000**
	Total	209.851	563			
Curriculum and	Between groups	21.748	2	10.874		

Instruction	Within groups	156.201	561	0.278	39.055	0.000**
	Total	177.950	563			
Program Management	Between groups	16.308	2	8.154		
	Within groups	614.942	561	1.096	7.439	0.001**
	Total	631.250	563			
Monitoring and evaluation	Between groups	7.225	2	3.613		
	Within groups	712.855	561	1.271	2.843	0.059
	Total	720.080	563			

In terms of Admission and Retention, the analysis reveals a statistically significant difference among the perceptions of school administrators, teachers, and students, with an F-value of 57.770 and a significance value of 0.000. This result indicates a strong variance in how each group perceives the implementation of this domain. Teachers and students, who are directly involved in the screening and retention processes, may view the mechanisms as either more stringent or lenient compared to administrators, who focus on policy-level decisions. According to Boudah et al. (2020), teachers and students often have a more personal and direct perspective on screening and retention processes, which may lead to differing views on their rigor or leniency compared to administrators. Fry et al. (2021) found that administrators, focusing on broader policy decisions, may prioritize efficiency and compliance, whereas teachers and students are more concerned with the day-to-day application of these processes and their direct impact on learning.

This implies that clearer communication and alignment on admission standards and student support strategies are needed across stakeholder groups. This aligns with the study of Fry et al. (2021) which emphasized that clear communication and alignment between administrators, teachers, and students are essential to ensure that all parties understand the expectations and support structures within educational programs. Kelley and Knowles (2021) argue that when admission standards and student support strategies are not well-communicated, it can lead to confusion, misalignment, and varying expectations among stakeholders.

For the domain of Curriculum and Instruction, a significant difference is also evident ($F = 39.055$, $p = 0.000$). This suggests differing perspectives in the actual delivery and content of the STE curriculum. Teachers, being the direct implementers, may report higher levels of curriculum execution, while students and administrators may observe gaps in consistency or integration of scientific inquiry, technological tools, and engineering design. These findings are supported by DepEd Order No. 55, s. 2016, which highlights the need for continuous teacher training and alignment in curriculum delivery, especially in specialized programs like STE.

In Program Management, there is again a significant difference ($F = 7.439$, $p = 0.001$) across the three groups. This might be due to the fact that school administrators are directly responsible for policy implementation and coordination, whereas teachers and students may experience program support and resources differently. Penuel et al. (2020) suggest that administrators, with a broader view, may overlook the day-to-day challenges teachers and students face in applying those policies. Ball and Forzani (2021) further note that these differing experiences can lead to a disconnect in how program effectiveness is perceived and implemented.

It emphasizes the necessity of more robust feedback systems and transparency between program implementers and beneficiaries in order to guarantee that management methods are perceived and experienced consistently. According to Hattie (2021), good feedback systems improve program outcomes by bringing implementers' and recipients' perspectives into alignment. Fullan (2020) emphasizes that openness encourages cooperation and guarantees that all parties involved have a shared understanding of the program's objectives, while Darling-Hammond et al. (2021) contend that effective program implementation and ongoing improvement depend on teachers, administrators, and students having clear lines of communication and feedback loops.

However, in Monitoring and Evaluation, the F-value is 2.843 with a significance level of 0.059, which is slightly above the 0.05 threshold. This means there is no statistically significant difference in how administrators, teachers, and students perceive this domain. This suggests a relatively uniform understanding of the evaluation practices in the STE program. The regular communication between administrators, teachers, and other involved parties likely contributes to a shared understanding, as stakeholders are kept informed about the methods and objectives of the evaluations. This may stem from the use of standardized evaluation criteria, ensuring consistent expectations across stakeholders. Standardized evaluation procedures align the understanding of all stakeholders, including administrators, teachers, and students, according to Bryk et al. (2020). In a similar vein, Hattie (2021) claims that these standards offer a trustworthy framework for evaluating the efficacy of programs, encouraging uniformity and clarity in expectations.

CONCLUSIONS

Based on the findings of this study, the following conclusions were drawn:

1. The STE Program was perceived by administrators, teachers, and students as very much implemented across all four domains: Admission and Retention, Curriculum and Instruction, Program Management, and Monitoring and Evaluation. However, student involvement in monitoring processes remains limited.
2.The learning resources and facilities provided for the implementation of the STE Program were assessed as Very Adequate by all respondent groups, although availability of specialized resources such as robotics kits and simulation tools remain limited
3.A significant difference existed in the perception of the extent of STE Program implementation across stakeholder groups in Admission and Retention, Curriculum and Instruction, and Program Management, while Monitoring and Evaluation was perceived consistently.

RECOMMENDATIONS

1. To sustain the high extent of implementation across core domains, existing effective practices should be institutionalized.
2. To address gaps in learning resources and facilities, especially in specialized facilities such as robotics kits and advanced laboratory tools, schools should pursue partnerships with LGUs, alumni associations, and external donors. Resource mobilization through local initiatives and grant writing may supplement existing funds to improve access to STE-supportive infrastructure.
3. Schools should conduct periodic convergence sessions among stakeholder groups to align perceptions, expectations, and feedback on program effectiveness, thereby promoting transparency and shared accountability.

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