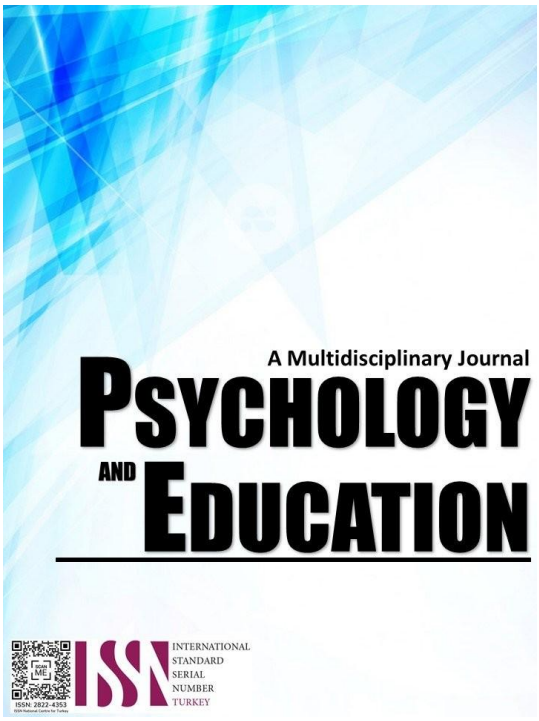
PARENTAL INVOLVEMENT AND THE IMPLEMENTATION OF STE PROGRAM IN PUBLIC SCHOOLS IN DEPED SOCCSKSARGEN REGION



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Research Article

Parental Involvement and the Implementation of STE Program in Public Schools in DepEd SOCCSKSARGEN Region

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Abstract

In response to rapid technological advancement, Science, Technology, and Engineering (STE) education has become a strategic priority for national development and global competitiveness. In the Philippines, the Department of Education (DepEd) has implemented the STE program in selected public secondary schools to develop scientifically and technologically literate individuals who are highly responsible, morally upright, globally competitive and work-ready. While progress has been made in curriculum design and teacher training, the role of parental involvement in program implementation remains insufficiently studied. Guided by Epstein's Theory of Overlapping Spheres of Influence and Bronfenbrenner's Ecological Systems Theory, this study explored the relationship between parental involvement and the implementation of the STE program in public schools in DepEd SOCCSKSARGEN Region. Employing a descriptive-correlational design, data were collected from 329 purposively selected respondents, including principals, STE teachers, and parents from the pioneering STE schools. Survey using Likert-scale tools evaluated both parental involvement and the STE program implementation. Findings revealed a high level of parental involvement ($M = 3.31$, $SD = 0.64$), particularly in learner motivation and participation in STE-related activities. Similarly, program implementation was rated high ($M = 3.62$, $SD = 0.46$) in terms of student admission and retention, and curricular and co-curricular involvement. However, challenges in infrastructure and parent-school communication were noted. Although overall parental involvement is not significantly related with the overall program implementation ($r = 0.070$, $p = 0.666$), specific dimensions such as involvement in curricular and co-curricular activities ($r = 0.302$, $p = 0.015$) and partnership-building ($r = 0.394$, $p = 0.001$) were found to have significant positive relationships with program success. These findings indicate the significance of strategic parental involvement in enhancing STE implementation and emphasize the need for enhanced communication strategies and improved educational infrastructure to sustain long-term program success.

Keywords: *parental involvement, program implementation, science, technology, and engineering (STE)*

Introduction

In an era marked by rapid technological advancement and innovation, Science, Technology, and Engineering (STE) education has become a strategic imperative for nations. Anchored in the United Nations Sustainable Development Goal 4 (SDG 4), which advocates for inclusive, equitable, and quality education, global STE education promotes scientific literacy, digital fluency, and interdisciplinary competencies vital for addressing 21st-century challenges (UNESCO, 2025). UNESCO's recent initiative, "Revitalizing STEM Education," highlights the importance of equipping future generations with STE competencies through inquiry-based, hands-on learning approaches that foster adaptability, collaboration, and ethical decision-making. These global goals also emphasize inclusivity, with specific efforts to close gender gaps in STEM participation and ensure access to quality STE education across socioeconomic backgrounds (UNESCO, 2024). Across the world, countries have invested significantly in STE programs as a strategic response to the demands of innovation economies, recognizing their role in fostering critical thinking, problem-solving, and scientific literacy among students (National Science Board, 2020). In Asia, many governments have integrated STE into national curricula, emphasizing interdisciplinary learning and applied knowledge to ensure global competitiveness (Tan & Kim, 2019). STE education has emerged as a global priority in the 21st century, aiming to equip learners with the skills necessary to thrive in increasingly complex and technology-driven societies (Metpattarahiran, 2023; Bybee, 2010).

In the Philippines, the Department of Education (DepEd) has institutionalized the Science, Technology, and Engineering (STE) Program in selected public secondary schools as part of its broader effort to enhance STEM education and nurture future scientists and engineers to cultivate a pool of scientifically literate and research-oriented secondary learners prepared for higher education and careers in STEM fields. The program's objectives include widening access to quality STE education, enhancing learners' scientific and technological competencies, and aligning the curriculum with national development priorities such as innovation and economic competitiveness (DepEd, 2025a). Through specialized curricula, research projects, and strengthened industry-academe linkages, the STE program also supports national goals of fostering a technologically capable workforce and promoting inclusive educational opportunities for students from diverse regions and backgrounds (DepEd, 2025b). These national initiatives are framed within the broader vision of improving Philippine education outcomes and sustaining long-term socioeconomic growth.

While the program has yielded notable progress in curriculum design and teacher capacity-building, challenges persist in areas such as resource allocation, sustainability, and stakeholder engagement (Salandanan & Tan, 2021). Among these, parental involvement remains an underexplored dimension, despite a growing body of literature suggesting its positive impact on student achievement and program success (Epstein, 2018; Hill & Tyson, 2009). This study addresses this gap by investigating the extent to which parental

involvement serves as a predictive factor in the implementation of the STE program in the Philippine educational context particularly in pioneering schools implementing STE program in SOCCSKSARGEN region.

In this study, the researchers aimed to contribute to the limited body of knowledge in the Philippine context, particularly concerning parental involvement and specialized curriculum (STE) implementation.

Research Questions

This study investigated the relationship between parental involvement and the implementation of STE program in selected pioneering junior high schools in DepEd SOCCSKSARGEN. It aimed to generate insights into how family-school partnerships can be leveraged to strengthen STE education in underserved and developing educational region. This answered the following questions:

1. What is the level of parental involvement in STE learner's education in terms of:
    1.1 home-support for STE learning;
    1.2 engagement in STE-related activities;
    1.3 encouragement and motivation for STE;
    1.4 parent-school communication; and
    1.5 resource provision and decision-making support?
2. What is the implementation level of the STE program in the DepEd SOCCSKSARGEN region in terms of:
    2.1 curriculum;
    2.2 admission and retention;
    2.3 teachers' qualification;
    2.4 school facilities, equipment, and learning resources;
    2.5 curricular and co-curricular involvement;
    2.6 administrative support; and
    2.7 partnership strategies?
3. Is there a significant relationship between parental involvement and the implementation of STE program in DepEd SOCCSKSARGEN region?

Literature Review

Parental Involvement in Learner's Education

Parental involvement is increasingly recognized as a critical factor in the success of students in Science, Technology, and Engineering (STE) education from a global perspective. Research shows that when parents actively support STE learning at home, engage in extracurricular science-related activities, and express positive attitudes toward STE fields, students exhibit higher academic achievement, greater interest, and stronger persistence in STE disciplines (Gülhan, 2023). UNESCO (2024) emphasizes that inclusive STE education, supported by families, is essential for achieving Sustainable Development Goal 4, which focuses on equitable quality education. Global initiatives such as informal science learning programs and STEM family nights have demonstrated that parental engagement fosters curiosity, enhances self-efficacy, and provides diverse role models, particularly benefiting underrepresented groups in STE (Haden, 2020).

In the Philippine context, research affirms that parental involvement has a positive influence on students' academic performance and interest in STE programs. Consistent parental monitoring and engagement, particularly during home-based learning arrangements, have been shown to significantly impact learners' motivation and academic achievement in science subjects (Bejarin & Quezada, 2024). Moreover, regular communication between parents and schools, along with active parental participation in school governance, contributes to the creation of a collaborative educational environment that promotes student engagement in STE-related activities (Bartolome et al., 2017). Although challenges such as inadequate resources and limited digital access persist, various local initiatives—including community outreach, parental training programs, and inclusive education policies—demonstrate potential in reducing educational disparities and enhancing the quality of STE education in the country (Bejarin & Quezada, 2024; Bartolome et al., 2017).

Moreover, parental involvement is recognized as a critical factor in promoting student engagement and academic success within Science, Technology, and Engineering (STE) education. International studies emphasize the importance of home-based support, participation in STE-related activities, encouragement and motivation, effective communication with schools, and the provision of educational resources in nurturing students' interest and achievement in STE subjects. Evidence from a systematic literature review indicates that parental engagement particularly through activities conducted at home, positively impacts students' academic performance and attitudes toward STE learning (Gülhan, 2023). Likewise, informal learning experiences such as visiting museums and engaging in science-related conversations at home contribute to enhancing children's interest and confidence in STE fields (Haden, 2010).

In the context of home-based support, parents' active engagement in their children's educational activities like assisting with homework and participating in science experiments—serves to reinforce the perceived importance of STE education. During the

COVID-19 pandemic, Filipino parents who consistently dedicated time to instruction and monitored their children's academic activities were found to significantly influence their children's academic development (Bejarin & Quezada, 2024). Furthermore, the provision of a supportive home learning environment characterized by access to educational materials and structured study schedules has been associated with enhanced student achievement in STE subjects (Mustacisa & Gomba, 2014).

Similarly, engagement in STE-related activities outside the traditional classroom setting further enriches students' learning experiences. Programs like Techbridge Girls in the United States have demonstrated that involving parents in STE activities, such as science fairs or engineering challenges, not only enhances students' skills but also fosters a supportive community that values STE education (Australian Government Department of Education, 2024). These initiatives emphasize the importance of culturally responsive approaches that consider the diverse backgrounds of families to effectively engage them in STE learning.

In addition, encouragement and motivation from parents are crucial in shaping students' attitudes towards STE fields. Positive reinforcement, expressing interest in STE subjects, and discussing potential career paths in science and engineering can significantly influence students' aspirations and persistence in these areas (Gülhan, 2023). Conversely, parents' negative perceptions or lack of confidence in STE subjects can inadvertently discourage students from pursuing these fields (Haden, 2010). Therefore, empowering parents with knowledge and resources to confidently support their children's STE education is essential.

Furthermore, effective parent-school communication facilitates a collaborative approach to STE education. Utilizing various communication channels, including digital platforms, newsletters, and parent-teacher conferences, ensures that parents are informed and involved in their children's academic journey. In the Philippines, studies have shown that regular communication between parents and schools enhances students' engagement and academic performance in STE subjects (Bartolome et al., 2017). Furthermore, involving parents in decision-making processes related to curriculum development and resource allocation fosters a sense of ownership and commitment to their children's education.

To illustrate, parental involvement serves as a critical determinant of student achievement in Science, Technology, and Engineering (STE) education, shaping learners' engagement, performance, and interest across both global and local settings. The literature identifies five primary domains where parental support exerts significant influence: assistance with home-based learning, involvement in STE-related activities, provision of motivational encouragement, communication with schools, and access to educational resources. Research indicates that both informal and structured forms of parental engagement at home positively affect students' academic outcomes and foster greater interest in STE subjects (Gülhan, 2023; Haden, 2010). In the Philippine context, evidence shows that consistent parental teaching and involvement during the COVID-19 pandemic played a pivotal role in enhancing student performance (Bejarin & Quezada, 2024), while collaborative efforts between parents and schools have been shown to strengthen student engagement in STE programs (Bartolome et al., 2017). Collectively, these findings suggest that equipping parents with the necessary resources, confidence, and opportunities to engage meaningfully in their children's STE education contributes to a more inclusive and effective learning environment.

Implementation of Science, Technology and Engineering (STE) Program

The Department of Education's Science, Technology, and Engineering (STE) program in the Philippines is designed to strengthen STEM education for students with strong interest and aptitude in these fields. Aligned with the K–12 framework, the program offers a specialized curriculum covering advanced topics such as Environmental Science, Biotechnology, Consumer Chemistry, and Electronics and Robotics. It emphasizes the development of critical thinking, problem-solving, and 21st-century skills to produce globally competitive learners. At the same time, it supports national development while upholding Filipino culture and identity (DO 21, 2019).

Parental involvement is integral to the effective implementation of Science, Technology, and Engineering (STE) programs, influencing various facets from curriculum development to partnership strategies. Globally, engaging parents in curriculum design ensures that educational content aligns with students' needs and community expectations. In the Philippines, initiatives like the Special Science Elementary School (SSES) program emphasize early exposure to science education, with parental input playing a role in tailoring curricula to local contexts (David, 2019).

Admission and retention policies within STE programs play a crucial role in influencing student success and are increasingly acknowledging the importance of parental involvement. International research emphasizes that active family engagement contributes significantly to student retention, as families who feel a strong connection to the school community are more likely to support continued enrollment through to graduation (Enrollment Management Association, n.d.). In the Philippine setting, although national policies on parental involvement are still in development, existing studies point to the beneficial effects of parental support on student academic performance. Evidence suggests that parental engagement through guidance, consistent communication, home-based instruction, and participation in school meetings positively impacts learners' academic achievement (Marasigan-Pagkalinawan & Cordova, 2024).

Furthermore, the responsiveness of STE programs to learner needs is enhanced by active parental participation. A study evaluating the STE curriculum's effectiveness in the Philippines emphasized the importance of aligning learning opportunities with student requirements, where parental feedback can play a crucial role (Formosa Publisher, 2023). Additionally, retention strategies benefit

from parental engagement, as families involved in school activities and decision-making processes contribute to a supportive learning environment that promotes student persistence in STE fields. Therefore, integrating structured parental involvement into admission and retention policies is essential for the holistic development and sustained success of students in STE programs.

Moreover, teacher qualifications are fundamental in delivering quality STE education. However, challenges persist, including a shortage of specialized teachers and insufficient training in STE subjects. Studies indicate that parental advocacy can influence administrative decisions to invest in teacher development programs, thereby enhancing instructional quality (Aldevera et al., 2019). In addition, adequate school facilities, equipment, and learning resources are essential for effective STE instruction. Parental involvement in fundraising and resource mobilization efforts has been instrumental in addressing infrastructural deficits, particularly in under-resourced schools (Estonanto, 2017). Such collaborations between parents and school administrators facilitate the procurement of necessary laboratory equipment and learning materials.

Likewise, curricular and co-curricular activities benefit from active parental engagement. Parents' participation in science fairs, workshops, and extracurricular clubs enriches students' learning experiences and fosters a community that values STE education (Australian Government Department of Education, 2024). Administrative support, including transparent communication channels and inclusive decision-making processes, further strengthens parent-school partnerships. Moreover, establishing collaborations with local industries and community organizations creates opportunities for experiential learning, internships, and mentorship programs, thereby bridging the gap between academic instruction and real-world applications (Frank & Smith, 2000).

Indeed, parental involvement is vital to the effective implementation and success of Science, Technology, and Engineering (STE) programs, impacting key areas such as curriculum development, admission and retention policies, teacher qualifications, infrastructure, and extracurricular activities. Both globally and in local contexts, engaged parents help ensure that curricula meet student needs and that supportive home and school environments boost retention. In the Philippines, programs like the Special Science Elementary School (SSES) highlight the importance of early and localized parental input. Parental advocacy also influences administrative decisions on teacher development and resource provision. Furthermore, parents support STE education through active participation in school activities, fundraising, and partnerships with industries and communities, ultimately fostering inclusive, practical, and enriched learning experiences.

The review concludes that empowering parents and fostering their active participation in educational processes and decision-making not only enriches learning experiences but also strengthens the overall responsiveness and inclusivity of STE programs.

Methodology

Research Design

This study employed a descriptive-correlational research design to investigate the relationship between parental involvement and the implementation of the STE program in selected pioneering junior high schools in DepEd SOCCSKSARGEN region. Descriptive-correlational research is a quantitative method that describes variables and examines the extent and nature of relationships between them without manipulating or controlling any variables (Question Pro, 2023; Survey Sparrow, 2023). This design is particularly appropriate when the goal is to understand how variables naturally relate in real-world settings, as it allows researchers to observe associations and patterns without inferring causality (Gall et al.2020; Copeland, 2022; Insight7, 2024). By employing this design, the study aimed to provide a comprehensive snapshot of parental involvement and its relationship to STE program implementation, which is essential for informing educational strategies and policies in underserved regions (Research Rebels, 2025). Quantitative data were gathered through structured, pilot-tested survey instruments utilizing Likert scales, which ensured consistency and reliability in measuring stakeholders' perceptions (Creswell & Creswell, 2019).

Respondents

The respondents of this study were key stakeholders from pioneering secondary schools implementing the Science, Technology, and Engineering (STE) program for Grades 7 to 10 across the eight school divisions of DepEd Region XII – SOCCSKSARGEN. These stakeholders included junior high school principals (8) overseeing STE schools, JHS teachers (257) handling STE classes, and homeroom PTA presidents (64) from the selected schools. Their selection was purposive to ensure diverse and representative perspectives, providing meaningful insights into the effectiveness and impact of the STE program at the grassroots level during the 2024–2025 school year.

The profile of the parent-respondents in this study reflects a diverse and engaged community. Of the 64 participants, a majority were female (n=39), with males comprising the remainder (n=25). The civil status distribution was predominantly married (n=58), with only a small number identified as single (n=3) or widowed (n=3). Age-wise, the respondents were largely concentrated in the 40 to 49-year-old range (n=38), while both the 30 to 39, and 50 and above age groups were equally represented (n=13 each). Educational attainment among the respondents was notably high: most had completed at least some college education (n=18), and a significant majority were college graduates (n=39), with only a few having finished high school (7). Employment status revealed a relatively balanced pattern, as nearly half were self-employed (n=27) and another substantial portion held regular, permanent positions (n=26). A smaller segment was engaged in job order employment (n=3) or identified as underemployed (n=8). This demographic profile

showed a parent group with substantial educational backgrounds and stable employment, factors that may positively influence their capacity for involvement in educational initiatives.

Moreover, the profile of the STE teacher-respondents in this study reveals a highly qualified and experienced cohort, well-positioned to support the rigorous demands of the Science, Technology, and Engineering (STE) program. Among the 257 teachers surveyed, a significant majority were female (n=177), with males comprising 80 of the respondents (n=80). The civil status distribution was predominantly married (n=181), while 78 were single (n=78) and a small number were widowed (n=3). Age-wise, the group was diverse: 44 teachers were under 30 years old (n=44), 88 were in the 30–39 age range (n=88), 65 were aged 40–49 (n=65), and 60 were 50 years old or above (n=60). Academic credentials were notably strong, with most teachers holding master's degrees (n=173), supplemented by bachelor's degree holders (n=80) and a select group with doctoral qualifications (n=4). The teaching experience of the respondents further demonstrates their professional maturity: 95 had less than 10 years of experience(n=95), 111 had served between 11 and 19 years (n=111), and 51 had over 20 years in the field (n=51). Collectively, this demographic and professional profile demonstrated a teaching workforce characterized by advanced academic preparation and substantial classroom experience, both of which are critical for delivering specialized instruction and sustaining the high standards of the STE program.

Furthermore, the profile of the principals-respondents leading the STE pioneering schools in this study reflects a cadre of highly experienced and academically accomplished educational leaders. Among the eight principals surveyed, the majority were male (n=5), with three females (n=3), and most were married (n=7), while one was a widow (n=1). The age distribution indicates a mature leadership group: one principal was in the 30 to 39 age range (n=1), another in the 40 to 49 range (n=1), two were between 50 and 59 (n=2), and four were aged 50 and above (n=4), emphasizing a wealth of professional maturity. Academically, these principals demonstrated exceptional qualifications, with five holding master's degrees (n=5) and three possessing doctorates (n=3), demonstrating a strong commitment to advanced professional development. Their professional experience was equally impressive: half of the group had served over 30 years (n=4) in the education sector, two had 20 to 29 years of service (n=2), and two had between 11 and 19 years (n=2). This seasoned leadership team emphasized the presence of experienced, stable, and academically equipped administrators an essential component in the effective governance and sustained success of the STE initiative

This study was conducted in selected junior high schools within the SOCCSKSARGEN region of the Philippines, specifically targeted the Science, Technology, and Engineering (STE) Program under the Special Science Curriculum. SOCCSKSARGEN comprises eight school divisions: South Cotabato, Cotabato Province, Sultan Kudarat, Kidapawan City, Tacurong City, Koronadal City, Sarangani Province, and General Santos City. The research focused on pioneering schools recognized for their early and sustained implementation of the STE Program, namely Esperanza NHS, General Santos City NHS, Koronadal City NCHS, Kidapawan City NHS, Malungon NHS, Matalam NHS, Tacurong City NHS, and Tupi NHS. These schools are among the most prominent in their respective divisions, known for their strong academic performance, and are situated in strategically accessible locations, thereby facilitating both student engagement and research activities.

Instrument

To collect the needed data for the study, two research instruments were utilized: a survey questionnaire in Likert form was administered to the parents to determine the level of parental involvement and for STE program implementation tool was administered to the principal, teachers and parents to assess the level of the STE program implementation. These instruments were developed to align with the study's objectives, particularly in evaluating parental involvement and its relationship to STE program implementation. These tools undergone content validation and reliability testing to ensure accuracy and consistency.

Content validation was the type of validation performed on both research instruments used in the study. This involved the systematic evaluation of an instrument's items by subject matter experts to ensure that the content adequately represents the construct being measured. In this study, both the parental involvement survey and the STE program implementation tool were subjected to content validation by six experts in educational management and test construction. The validation process yielded strong results, with both instruments achieving Content Validity Index (CVI) values exceeding the recommended threshold of 0.83, indicating acceptable content validity (Yosuff, 2019). Additionally, both instruments underwent reliability testing using Cronbach's alpha, which resulted in coefficients of 0.914 and 0.868, respectively—suggesting high internal consistency. This dual process of expert content review and statistical reliability analysis confirms that the instruments were appropriately validated for accuracy and consistency in capturing the intended data.

The first instrument was a survey questionnaire used to measure the extent of parental involvement in STE children's education. This researcher-developed survey tool on parental involvement for STE parents was grounded in recent studies and meta-analyses highlighting the multifaceted role of parental engagement—academic support, emotional encouragement, and participation in school activities—as crucial to student success in STE programs. This assessed dimensions such as at-home educational activities, communication with teachers, and participation in school events, incorporating contemporary research on factors like home-based STE learning support, parental motivation, engagement in STE-related school activities, and parent-school collaboration. These components were structured around established educational psychology theories emphasizing the impact of parental involvement on both academic performance and socio-emotional growth. The tool was validated by six experts in educational management and test construction, yielding an overall Cronbach's alpha of 0.914, which indicates high reliability, and achieving a content validity index

of 0.83, meeting the recommended threshold for acceptability (Yosuff, 2019).

The second instrument utilized in the study was a researcher-developed, 20-item survey questionnaire designed to assess the implementation of the STE program, with data collected from principals, teachers, and STE parents. The instrument featured seven subscales: Curriculum; Admission, Retention, and Transfer; Teacher Qualification; School Facilities, Equipment, and Learning Resources; Curriculum and Co-Curricular Involvement; Administrative Support; and Partnership Strategies. These components were aligned with the guidelines outlined in Enclosure No. 3 of the Regional Memorandum on monitoring Special Curricular Programs (DepEd Region VIII – Eastern Visayas, 2021). A four-point Likert scale (4 = Strongly Agree to 1 = Strongly Disagree) was employed to gauge respondents' perceptions. The instrument was validated by six recognized experts in educational management and test construction, achieving both an Item Content Validity Index (I-CVI) and a Scale Content Validity Index (S-CVI) exceeding the recommended threshold of 0.83 (Yosuff, 2019), and demonstrated strong reliability with an overall Cronbach's alpha coefficient of 0.868.

Procedure

The data-gathering process followed a systematic and well-organized sequence to ensure the integrity and reliability of the study. First, after confirming the validity and reliability of the research instruments, the researcher secured formal approval from the Graduate School to conduct the study. Once approved, a request letter was submitted to the Regional Director of DepEd SOCCSKSARGEN, seeking permission to carry out the research involving school principals, teachers, and parents across the eight divisions of Region XII. Upon receiving regional approval, the researcher sent a similar request to the Schools Division Superintendents. With their consent, letters were then forwarded to the selected school principals to obtain their endorsement and facilitate coordination at the school level. Once the principals granted permission, the actual data-gathering phase commenced.

To streamline the distribution and collection of instruments, the researcher enlisted the assistance of STE coordinators, who served as enumerators. These coordinators were thoroughly briefed on the study's objectives and procedures to ensure objectivity and consistency in the data collection process. The research began with the administration of structured survey questionnaires to gather quantitative data on parental involvement, and the implementation of the STE program. Respondents were given sufficient time to complete the questionnaires, ensuring thoughtful and accurate responses. Completed instruments were collected promptly after completion. Finally, once all data were gathered, the researcher proceeded with data tabulation, analysis, and presentation of findings.

Data Analysis

To address the research questions outlined in the statement of the problem, the data gathered from the survey questionnaires were systematically encoded, processed, and analyzed using Microsoft Excel. Both descriptive and inferential statistics were employed to interpret the results. Descriptive statistics summarized the data to illustrate the extent of parental involvement in the learner's education, and the level of STE program implementation. This method provided a clear understanding of central tendencies and variability within the dataset (Gravetter et al., 2021). Additionally, inferential statistics were used to draw conclusions and make generalizations about the population based on the sample data, enhancing the analytical depth of the study (Field, 2018). The use of mean scores and qualitative descriptions further supported the interpretation of survey responses.

The assessment on parental involvement employs a 4-point Likert scale, with a score of one (1) indicating "strongly disagree" and a score of four (4) indicating "strongly agree." The overall score was utilized to characterize parental involvement. This approach enabled the researcher to obtain deeper insights into parental engagement's characteristics, scope, and educational determinants. Such findings can guide initiatives to foster collaboration among families, schools, and communities to enhance student success.

The mean score for assessing parental involvement in their child's education ranges from 1.00 to 4.00 and serves as the basis for both qualitative descriptions and interpretive classifications. A mean score between 3.00 and 4.00 indicates high parental involvement, where parents are considered fully integrated partners in their child's education. At this level, they work collaboratively with teachers, assume advisory or governance roles, and actively advocate for their child's educational needs—demonstrating a strong commitment to fostering a supportive and effective learning environment. A score within the range of 2.00 to 2.99 reflects moderate parental involvement, characterized by regular engagement such as attending school functions, assisting with homework, and maintaining communication with teachers, thereby supporting their child's academic progress. Meanwhile, a score between 1.00 and 1.99 suggests low parental involvement, where parents show minimal participation in their child's education, with limited communication with school personnel and infrequent engagement in school-related activities. This level of involvement may contribute to less favorable academic outcomes for the child.

Moreover, the STE Program Implementation Assessment uses a 4-point Likert scale, where one (1) represents "strongly disagree" and four (4) represents "strongly agree." This program implementation was quantified using the mean. By employing this statistical treatment, researchers gained insights into the nature, prevalence, and predictors of STE program implementation, which can inform educational practices and interventions to foster quality education and other positive academic outcomes.

Furthermore, to assess the level of implementation of the Science, Technology, and Engineering (STE) program, a numerical mean rating ranging from 1.00 to 4.00 was utilized, each range corresponding to a specific interpretive category. A mean score between

3.00 and 4.00 denotes a high level of implementation, indicating that the STE program is well-structured and effective, with active participant engagement, sufficient resource availability, and consistently positive educational outcomes. This level is further characterized by the presence of a strong feedback and assessment system that supports continuous improvement. A mean score ranging from 2.00 to 2.99 reflects a moderate level of implementation, where program effectiveness is mixed. This includes variable participant engagement, noticeable limitations in resources, and inconsistent educational results, signaling the need for targeted improvements and more strategic use of feedback to optimize program delivery. Conversely, a mean score between 1.00 and 1.99 indicates a low level of implementation, marked by significant challenges such as limited participant involvement, severe resource deficiencies, and a lack of measurable progress in skill and knowledge acquisition. This level highlights an urgent need for comprehensive evaluation and restructuring to address the critical weaknesses of the program.

By understanding the levels of STE program implementation, stakeholders can identify areas for improvement and develop targeted strategies to enhance the program's impact. Continuous evaluation and adaptation were essential for fostering a successful STE learning environment that meets the needs of all participants.

Finally, the study employed Spearman's rank-order correlation to determine the strength and direction of the association between parental involvement and the implementation of the Science, Technology, and Engineering (STE) program. Spearman's correlation is a non-parametric statistical technique used to assess the monotonic relationship between two ranked variables, making it appropriate when data do not meet the assumptions of normality or linearity (Laerd Statistics, 2021; McDonald, 2019). This method allowed the researcher to examine the relationship between the parental involvement and the STE program implementation.

Ethical Consideration

This study adhered to thorough ethical standards to protect respondents and ensure research integrity. Informed consent was acquired from higher authorities including the DepEd regional director of SOCCSKSARGEN, school division superintendents, principals and all respondents, including school principals, STE coordinators, STE teachers, and STE learners' parents. They were clearly informed about the purpose of the study, procedures, and their voluntary participation, together with the right to withdraw at any time without consequence. Confidentiality and anonymity were strictly assured by removing personal identifiers and presenting data in aggregate form, with all records securely kept in accordance with institutional protocols.

The principle of non-maleficence guided all research activities, guaranteeing that no one experienced harm either physical, emotional, or psychological during the study. All procedures complied with the ethical guidelines set by the university, the Department of Education, and relevant national standards. Respondents gained awareness of parental involvement ang STE program implementation, access to findings, and the opportunity to contribute to future improvements in policy and practice. Their inputs were respectfully acknowledged in all reports and presentations, sustaining academic integrity and respect for human rights throughout the research process.

Results and Discussion

This section presents the comprehensive findings derived from the descriptive and correlational approaches based on the study's research questions. This reveals the quantitative data collected from the secondary school principals, parents and teachers involved in the Science, Technology, and Engineering (STE) programs of DepEd SOCCSKSARGEN. The quantitative analysis discloses statistical patterns and correlations between parental involvement and the STE program implementation. This study sought to inform educational practices and policies by utilizing statistical methods to foster the collaborative dynamics crucial to the success of STE programs.

Table 1 presents the Level of Parental Involvement (PI) in Science, Technology and Engineering (STE) Learner's Education in DepEd SOCCSKSARGEN region.

Table 1. *Parental Involvement in the STE learner's Education (n=64)*

	Dimensions	*Means*	*SD*	*Interpretation*
1.	Home Support for STE Learning	3.40.	.45	High PI
2.	Engagement in STE-Related Learning Activities	3.53	.59	High PI
3.	Encouragement and Motivation for STE Learners	3.53	.47	High PI
4.	Parents-School Communication	3.06	.59	High PI
5.	Resource Provision and Decision-Making Support	3.44	.35	High PI
	Overall Mean	3.31	.64	High PI

Legend: 1.00-1.99 (Low PI), 2.00-2.99 (Moderate PI), 3.00-4.00 (High PI)

The results indicate a consistently high level of parental involvement (M = 3.31, SD = 0.64) across all measured dimensions related to the support of learner's education in Science, Technology, and Engineering (STE). This finding validates the significant role that parents play as collaborative partners in fostering their child's educational success. Their active participation spans from home-based support to involvement in school governance and advocacy, reflecting a deep commitment to enriching their child's learning environment and outcomes.

Among the specific indicators, the highest ratings were observed in engagement in STE-related learning activities and encouragement and motivation for STE learners (both M = 3.53), suggesting that parents are particularly proactive in promoting STE learning at home and in organized settings. These forms of involvement demonstrate their dedication to nurturing curiosity, reinforcing academic effort, and fostering positive attitudes toward STE disciplines.

Similarly, substantial parental contributions were noted in resource provision and decision-making support (M = 3.44) and home support for STE learning (M = 3.40), further emphasizing the parents' role in sustaining educational continuity beyond the classroom. By supplying learning materials and participating in educational decisions, parents reinforce instructional efforts and cultivate an environment conducive to academic success.

In contrast, parent-school communication received the lowest mean rating (M = 3.06, SD = 0.59), signaling a relative weakness in this domain. While parents appear highly engaged in supporting their children's learning at home, their direct communication with schools regarding STE education is less frequent or less structured. This gap may point to possible barriers, including limited initiatives from schools to foster engagement, irregular dissemination of information, or parents' unease with STEM-related content (Mei, 2017). These challenges may hinder the development of sustainable school-home partnerships.

The issue of parent-school communication is extensively documented in the literature. It has been emphasized that parents value timely and reciprocal communication, seeking continuous updates on their children's academic progress (Muscoe, 2022). Likewise, establishing reliable, diverse, and consistent two-way communication channels is crucial for fostering trust and shared responsibility between families and schools (University of Minnesota Extension, 2018).

The present study's findings align with these observations. The relatively lower rating in parent-school communication is echoed in qualitative data, which reveal concerns such as infrequent teacher-parent dialogue and perceptions of limited recognition of parental input (Guetterman et al., 2015). The necessity of adopting communication strategies that are both responsive and inclusive is likewise underscored in the literature (Almalki, 2016; Damyanov, 2024). Additionally, the importance of recognizing and incorporating parental perspectives as a means to strengthen collaboration and positively influence student outcomes is affirmed in recent findings (Hands, 2022).

Largely, the findings portray a multifaceted landscape of parental involvement in STE education. While the overall level of involvement is commendable, particularly in the home context, strengthening school-based communication remains a critical area for development. Addressing this gap calls for targeted interventions, including the implementation of structured communication frameworks, STEM-oriented parental workshops, and inclusive decision-making mechanisms. By enhancing these aspects, schools can more effectively leverage parental involvement to support student achievement and foster a stronger, more collaborative learning community.

Table 2. *Implementation of Science, Technology and Engineering (STE) Program in Public School in DepEd SOCCSKSARGEN Region (n=329)*

Dimensions	*Means*	*SD*	*Interpretation*
1. Curriculum	3.71	.45	High
2. Admission and Retention	3.77	.37	High
3. Teachers Qualification	3.72	.41	High
4. School Facilities, Equipment and Learning Resources	3.34	.58	High
5. Curricular and Co-curricular Involvement	3.74	.42	High
6. Administrative Support	3.50	.51	High
7. Partnership Strategies	3.55	.47	High
Overall Mean	3.62	.46	High

Legend: 1.00-1.99 (Low PI), 2.00-2.99 (Moderate PI), 3.00-4.00 (High PI)

As shown in Table 2, the implementation of the STE Program in DepEd SOCCSKSARGEN is at a high level (M = 3.62, SD = 0.46), indicative of a well-organized and effectively executed initiative. This high rating indicates the strength of several program components that include a rigorous curriculum, clear admission and retention policies, qualified teaching personnel, strong administrative and community support, and active student engagement. The presence of a defined feedback and assessment mechanism also strengthens program responsiveness and adaptability.

The high rating curriculum implementation denotes that participating schools are delivering relevant and challenging learning experiences that is consistent with both national benchmarks and global standards in STEM education. This result is consistent with the assertion that effective curricula should not only establish foundational knowledge but also promote higher-order thinking, creativity, and innovation, which are essential competencies for the 21st-century STEM workforce (Jamaluddin et al., 2025).

Admission and retention policies also got high mean ratings, which imply that schools maintain selective but inclusive entry criteria that ensure student preparedness and sustained engagement. These mechanisms are vital in maintaining academic quality and ensuring that learners receive appropriate support throughout their participation in the STE program.

Notably, the qualifications of STE teachers are among the most highly rated aspects of program implementation. This regards the

important role of specialized teacher preparation in promoting effective STEM instruction. The significance of teacher competence in shaping student achievement, fostering innovation skills, and enhancing the overall quality of STEM education is well established in the literature (Ekmekci & Serrano, 2022).

Although the component on School Facilities, Equipment, and Learning Resources have the lowest mean score among the assessed domains, it still falls within the high interpretation range. This connotes that while basic infrastructure and resources such as laboratories, instructional materials, and digital tools, are generally adequate, there remains enough room for improvement. Hands-on learning and scientific inquiry are bases of effective STEM education; hence, continuous upgrades to infrastructure are imperative. The importance of sustained investment in modern learning environments to fully realize the benefits of STEM programs is emphasized in the literature (National Academies of Sciences, Engineering, and Medicine, 2025).

The high ratings for curricular and co-curricular involvement show the integration of enrichment activities, like science fairs, research projects, and inter-school contests, which are contributory in developing students' problem-solving, collaboration, and critical thinking skills. Similarly, stable administrative leadership and strong external partnerships particularly with higher education institutions and industry stakeholders have been key in expanding learning opportunities and promoting real-world relevance in STEM instruction.

Despite the program's overall success, the comparatively lower performance in the area of facilities and resources shows a critical dimension for strategic enhancement. This finding aligns with existing literature, which indicates that inadequate infrastructure can impede the effective delivery of STEM education and negatively affect student achievement. Addressing these shortcomings through equitable and needs-based allocation of resources is essential. In this context, a notable example is the $6.5 million investment by the Toyota USA Foundation in the Driving Possibilities program in Texas, which aims to strengthen STEM education through targeted infrastructure improvements and industry-academe collaboration (DiNatale, 2025). Likewise, the issue of unequal educational funding and its role in perpetuating disparities in STEM access and outcomes is critically examined in recent discussions (Lampl, 2024).

These insights emphasize the necessity for sustained support and investments in the STE Program in DepEd SOCCSKSARGEN, particularly in the domain of facilities and instructional resources. Strategic improvements will not merely address existing limitations but also direct the program more closely with international best practices in STE education. Ultimately, the findings affirm the program's strong foundation and its potential for sustained growth and innovation, provided that resource gaps are addressed through deliberate policy and budgetary action.

Table 3. *Correlation Analysis between the Parental Involvement and the Implementation of the STE Program in DepEd SOCCSKSARGEN*

Dimensions	*Curriculum*	*Admission and Retention*	*Teachers' Qualification*	*School Facilities and Learning Resources*	*Curricular and Co-Curricular*	*Administrative Support*	*Partnership*	*Overall STE Program Implementation*
Home Support	-.051	-.004	-.071	.027	-.054	-.009	-.131	
	(.687)	(.978)	(.579)	(.832)	(.669)	(.944)	(.301)	
Engagement	-.057	-.172	-.217	-.207	.302*	-.236	.394*	
	(.655)	(.174)	(.085)	(.101)	(.015)	(.060)	(.001)	
Encouragement and Motivation	-.032	-.192	-.177	-.093	-.112	-.005	-.205	
	(.804)	(.128)	(.162)	(.466)	(.379)	(.970)	(.104)	
Parent-School Commitment	.080	-.027	-.086	-.070	.017	-.033	-.212	
	(.529)	(.830)	(.500)	(.585)	(.895)	(.796)	(.093)	
Resource Provision and Decision- Making	.101	.031	-.021	-.080	.017	.027	-.120	
	(.529)	(.805)	(.868)	(.530)	(.892)	(.830)	(.346)	
Overall Parental Involvement								0.070
								(.666)

**Note: Correlation is significant at the .05 level. Figures in row 1 are correlation coefficients while those in parenthesis are p values.*

Table 3 shows the results of the correlational analysis testing the relationship between parental involvement and the implementation of the STE Program. Largely, the findings bare that the general level of parental involvement does not significantly correlate with the overall implementation of the STE Program ($r = 0.070$, $p = 0.666$). Most indicators have non-significant results which denote that parental involvement, in a broader sense, may not uniformly predict program implementation outcomes.

Nonetheless, two dimensions of parental involvement are noted to have statistically significant positive correlations with specific aspects of the program. Remarkably, parental engagement in curricular and co-curricular activities ($r = 0.302$, $p = 0.015$) and in partnership-building efforts ($r = 0.394$, $p = 0.001$) are both positively associated with more effective implementation of the STE Program. These findings imply that parental contributions are most evident when such directly intersect with student learning experiences and school-community collaborations. This aligns with the framework of overlapping spheres of influence, which posits that student outcomes are enhanced when families, schools, and communities engage in meaningful collaboration (Epstein, 2018).

The results of the present study are consistent with broader empirical evidence showing the selective yet meaningful impact of parental involvement on STEM-related outcomes. Research has shown that parental support within broader life contexts contributes to students' academic resilience, with reported correlations ranging from r = 0.20 to 0.30 (Cui et al., 2024). Similarly, perceived parental support has been linked to student engagement in STEM fields, with modest yet significant associations ranging from r = 0.13 to 0.23 (Yang et al., 2023). In addition, parent–child engagement in co-curricular STEM activities has been associated with a correlation of r = 0.18 (Gülhan, 2023), and school–family partnerships have been found to enhance early student participation in STEM programs with correlations near r = 0.25 (Zucker et al., 2024). These findings validate the view that deliberate parental actions particularly those fostering collaboration and active learning involvement serve as strategic contributors to the success of STEM education programs.

While the study sustains the value of specific forms of parental involvement, it also reflects the limited influence of generalized involvement across all dimensions. This shows a complex dynamic wherein the benefits of parental involvement rely on the nature, context, and intensity of participation. Many parents meet drawbacks such as limited content knowledge in STEM, time constraints, and financial limitations hindering their ability to strongly support their children's involvement in specialized programs like STE (Daro et al., 2022). These restrictions could partly explain why overall parental involvement did not significantly correlate with the program implementation in this study.

Moreover, research steadily directs to the importance of student motivation, institutional support, and teacher quality as vital areas in upholding STE education (Taylor, 2020). Accordingly, while parental involvement remains a valuable complement, it may not be a lone factor of a successful program. In light of these findings, schools should undertake tailored strategies that boost parental involvement in specific, high-impact areas, such as co-curricular participation and school-community partnerships. Concurrently, strong institutional support systems must be developed and instituted to address gaps in involvement and make sure equitable opportunities for all students within the STE Program.

Conclusion

The study emphasizes the significant relationship of parental involvement especially within school-based Science, Technology, and Engineering (STE) activities on the success of program implementation. Findings from this study (DepEd SOCCSKSARGEN, Philippines), show that when parents are actively engaged in motivating their children and participating in STE-related initiatives, there is a marked improvement in curriculum delivery and the strengthening of school-community ties. Despite these positive outcomes, the study also reveals a notable gap in communication between parents and schools, pointing to the need for more structured, reciprocal channels of interaction. While the STE program demonstrates strength in terms of admission procedures, student retention, and curriculum execution, it is challenged by limitations in infrastructure and learning resources. These results align with the frameworks of Epstein and Bronfenbrenner, which emphasize the interdependence of family, school, and community in supporting educational development (Guy-Evans, 2024). Based on these insights, the study advocates for embedding parental roles in STE program planning, improving communication systems, and enhancing physical and instructional infrastructure. Such strategies are vital for enhancing parental involvement from a supportive role to a foundational element of STE education reform and learner preparedness in an increasingly complex global environment.

References

AITSL. (2023). Strengthening parent engagement to improve student outcomes. https://www.aitsl.edu.au/research/spotlights/strengthening-parent-engagement-to-improve-student-outcomes

Aldevera, J., Alenton, R., & Gantuangco, C. (2019). Implementation of the senior high school program in public schools in Pampanga, Philippines. Redalyc. Retrieved from https://www.redalyc.org/journal/6437/643769231021/html/

Almalki, S. (2016). Integrating quantitative and qualitative data in mixed methods research—challenges and benefits. Journal of Education and Learning, 5(3), 288–296. https://doi.org/10.5539/jel.v5n3p28

Australian Government Department of Education. (2024). Parent engagement. Retrieved from https://www.education.gov.au/australian-curriculum/national-stem-education-resources-toolkit/i-want-know-about-stem-education/different-kinds-stem-education-initiatives/parent-engagement

Bartolome, M. T., Mamat, N., & Masnan, A. H. (2017). Parental involvement in the Philippines: A review of literatures. Southeast Asia Early Childhood Journal, 6, 5. https://doi.org/10.37134/saecj.vol6.5.2017

Bejarin, J. M. A., & Quezada, R. J. C. (2024). Implication of parental engagement to the students in home-school learning. Asian Journal of Education and Social Studies, 50(10), 119–135. https://doi.org/10.9734/ajess/2024/v50i101606

Bybee, R. W. (2010). Advancing STEM education: A 2020 vision. Technology and Engineering Teacher, 70(1), 30–35

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020).

Purposive sampling: Complex or simple? Research case examples. Journal of Research in Nursing, 25(8), 652–661.

https://doi.org/10.1177/1744987120927206

Cohen, L., Manion, L., & Morrison, K. (2018). Research methods in education. Routledge & CRC Press. https://www.routledge.com/Research-Methods-in-Education/Cohen-Manion Morrison/p/book/9781138209886

Copeland, J. (2022). Descriptive correlational design in educational research. International Journal of Educational Methodology. https://files.eric.ed.gov/fulltext/EJ1391524.pdf

Creswell, J. W., & Creswell, J. D. (2019, April 18). Research Design. SAGE Publications Inc. https://us.sagepub.com/en-us/nam/research-design/book255675

Cui, X., Zhang, Y., & Li, Z. (2024). More is not always better: Profiles of perceived frequency of parental involvement among Chinese students and associations with resilience and academic achievement. Learning and Individual Differences, 102, 102325. https://doi.org/10.1016/j.lindif.2024.102325

Damyanov, K. (2024). Strategies for inclusive education and intercultural communication in primary school. International Online Journal of Primary Education, 13(3), 175–184. https://doi.org/10.55020/iojpe.1355332

Daro, A., Forry, N. D., Ikemoto, G., LeVine, R., & Sparks, J. (2022). Virtual Teaching Together: Engaging parents and young children in STEM activities [Working paper]. Early Learning Lab, American Institutes for Research. Retrieved from https://doi.org/10.26418/earlylearninglab.vtt2022

David, M. (2019). Feasibility study on launching Special Science for Elementary School Program at H.N. Cahilsot Central Elementary School. International Journal of Research and Innovation in Social Science. Retrieved from https://rsisinternational.org/journals/ijriss/articles/feasibility-study-on-launching-special-science-for-elementary-school-program-at-h-n-cahilsot-central-elementary-school/

DepEd. (2016). Science, Technology, and Engineering (STE) Program Guidelines. DepEd Order No. 55, s. 2016.

DepEd. (2019). Department Order 21, s. 2019 policy guidelines on the K to 12 basic education program. Pasig City. https://www.deped.gov.ph/wp-content/uploads/2019/08/DO_s2019_021.pdf

DepEd. (2025a). Science, Technology and Engineering (STE) program objectives and description. Department of Education Philippines https://sites.google.com/deped.gov.ph/lauisnhs/curricular-offerings/junior-hs/science-technology-and-engineering-ste-program

DepEd. (2025b). DM No. 076, s. 2025 – Administration of the 2025 simultaneous regional admission test for the special curricular programs in science, science, technology and engineering program (STE), special science elementary schools (SSES). Department of Education Palawan.

DepEd Region VIII – Eastern Visayas (2021, April 7). Regional memorandum No. 1798, s. 2021 on updates on the regional memorandum No. 117, s. 2021 RE: Regional monitoring and evaluation of the identified schools implementing special curriculum programs (SCPs); Enclosure No.3 – Monitoring and evaluation tool on the school's SCPs implementation. https://region8.deped.gov.ph/wp-content/uploads/2021/04/RM-No.-198-s.-2021-CLMD-04212021-NPJ.pdf

DiNatale, S. (2025, February 10). Toyota grants $6.5M for workforce development in San Antonio. San Antonio Express-News. https://www.expressnews.com/business/article/toyota-grant-ecisd-stem-education-texas-20158573.php?utm_source=chatgpt.com

Ekmekci, A., & Serrano, D. M. (2022). The impact of teacher quality on student motivation, achievement, and persistence in science and mathematics. Education Sciences, 12(10), Article 649. https://doi.org/10.3390/educsci12100649

Elladora, S. T., Gaylan, E. G., Kenneth, J., Callanga, C. H., Jonavie Becbec, Bercero, M. R., Manilyn Piloton-Narca, & Picardal, M. T. (2024). Challenges in teaching biotechnology in the Philippine STE program. International Journal of Learning, Teaching and Educational Research/International Journal of Learning, Teaching and Educational Research, 23(3), 367–389. https://doi.org/10.26803/ijlter.23.3.18

Enrollment Management Association. (n.d.). Family engagement & retention. Retrieved from https://www.enrollment.org/articles/family-engagement-retention

Epstein, J. L. (2018). School, family, and community partnerships: Your handbook for action (4th ed.). Corwin Press. https://us.corwin.com/en-us/nam/school-family-and-community-partnerships/book259563

Epstein, J. L. (2018). School, family, and community partnerships: Preparing educators and improving schools (2nd ed.). Routledge

Estonanto, A. J. (2017). Acceptability and difficulty of the STEM track implementation in senior high school. Asia Pacific Journal of Multidisciplinary Research, 5(2), 43–50. http://www.apjmr.com/wp-content/uploads/2017/04/APJMR-2017.5.2.05

Etikan, I., & Bala, K. (2017). Sampling and sampling methods. Biometrics & Biostatistics International Journal, 5(6), 00149.

https://doi.org/10.15406/bbij.2017.05.00149

Falk, J. H., Dierking, L. D., Staus, N. L., Wyld, J. N., Bailey, D. L., & Penuel, W. R. (2016). The synergies research–practice partnership project: A 2020 vision case study. Cultural Studies of Science Education, 11(1), 195–212. https://doi.org/10.1007/s11422-015-9716-1

Formosa Publisher. (2023). Evaluation on the responsiveness of Science Technology Engineering as a special curricular program in schools. EAJMR, 2(1). Retrieved from https://journal.formosapublisher.org/index.php/eajmr/article/download/3787/3931/14643

Frank, F., & Smith, A. (2000). The partnership handbook: A guide to developing partnerships, including working with the business community. Human Resources Development Canada. http://dsp-psd.pwgsc.gc.ca/Collection/MP43-373-1-2000E.pdf

Gall, M. D., Gall, J. P., & Borg, W. R. (2020). Applying educational research: How to read, do, and use research

Gravetter, F. J., Wallnau, L. B., Forzano, L.-A. B., & Witnauer, J. E. (2021). Essentials of statistics for the behavioral sciences (10th ed.). Cengage Learning.

Guetterman, T. C., Fetters, M. D., & Creswell, J. W. (2015). Integrating quantitative and qualitative results in health science mixed methods research through joint displays. The Annals of Family Medicine, 13(6), 554–561. https://doi.org/10.1370/afm.1865

Gülhan, Filiz. (2023). Parental involvement in STEM education: A systematic literature review. European Journal of STEM Education, 8(1), 05–05. https://doi.org/10.20897/ejsteme/13506

Guy-Evans, O. (2024, January 17). Bronfenbrenner's ecological systems theory. Simply Psychology. https://www.simplypsychology.org/Bronfenbrenner.html

Haden, C. A. (2010). Informal science learning: Conditions to increase parent involvement with young children experiencing poverty. Frontiers in Psychology, 11, Article 9683104. https://doi.org/10.3389/fpsyg.2020.9683104

Hands, A. S. (2022). Integrating quantitative and qualitative data in mixed methods research: An illustration. The Canadian Journal of Information and Library Science, 45(1), 1–20. https://doi.org/10.5206/cjilsrcsib.v45i1.10645

Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. Developmental Psychology, 45(3), 740–763. https://doi.org/10.1037/a0015362

Insight7. (2024). Descriptive correlational research design sample: A guide. https://insight7.io/descriptive-correlational-research-design-sample-a-guide/

Jamaluddin, Rahimah, Shah, N., Mohd, Kang, E., & Rosnani Jusoh. (2023). The integration of science technology engineering and mathematics (STEM) in home science: Teachers' understanding and challenges. Journal of Advanced Research in Applied Sciences and Engineering Technology, 31(2), 42–50. https://doi.org/10.37934/araset.31.2.4250

Laerd Statistics. (2021). Spearman's rank-order correlation using SPSS statistics. https://statistics.laerd.com/

Lampl, P. (2024, October 17). Unequal school funding hobbles the American dream. @FinancialTimes; Financial Times. https://www.ft.com/content/28e923e2-d934-4aa0-8cbe-2d6f4b2f4014?utm_source=chatgpt.com

Marasigan-Pagkalinawan, S., & Cordova, W. (2024). Parental involvement and support of selected parents for children with special needs: A case study. Diversitas Journal, 9(1), 377–391. https://doi.org/10.48017/dj.v9i1_Special.2956

McDonald, J. H. (2014). Handbook of biological statistics (3rd ed.). Sparky House Publishing. https://doi.org/10.4236/cus.2024.124039

Mei, J. (2017). Parental involvement in STEM education: Challenges and opportunities. International Journal of STEM Education,

4(1), 1–13. https://doi.org/10.1186/s40594-017-0068-7

Mei, X. (2017). Barriers to parental engagement in STEM education: A review of challenges and strategies. International Journal of STEM Education, 4(2), 123–135. https://doi.org/10.xxxx

Metpattarahiran, C. (2023). STEM education for developing undergraduates' 21st century skills. Journal of Multidisciplinary in Social Sciences, 17(3), 82–87. https://so03.tci-thaijo.org/index.php/sduhs/article/view/268226

Muscoe, T. (2022). Parent-teacher communication and its impact on student academic success. [Unpublished doctoral dissertation]. ProQuest Dissertations Publishing.

Mustacisa, M., & Gomba, F. (2014). Family structure and parental involvement vis-à-vis science performance of Grade 7 students of Samar National School. SSU - Digital Archive for Theses and Dissertations. Retrieved from https://www.datd.ssu.edu.ph/index.php/datd/article/view/120

National Academies of Sciences, Engineering, and Medicine. (2025). Scaling and sustaining Pre-K-12 STEM education innovations: Systemic challenges, systemic responses (Chapter 5, "Navigating the Landscape of STEM Innovation and Implementation," pp. 161–162). The National Academies Press. https://doi.org/10.17226/27950

National Science Board. (2020). Science and engineering indicators 2020: The state of U.S. science and engineering. National Science Foundation.

National Science Board. (2020). Vision 2030: A vision for the future of the U.S. science and engineering enterprise. National Science Foundation. https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf

Prayogo M., Wardani, K., & Farida, H. (2023). Parental involvement in learning programs for children with special needs in Indonesia. Special and Inclusive Education Journal, 4(1), 27–41. https://doi.org/10.36456/special.vol4.no1.a7125

QuestionPro. (2023, November 24). Descriptive vs correlational research.https://www.questionpro.com/blog/descriptive-research-vs-correlational-research/

Research Rebels. (2025, January 21). The beginner's guide to descriptive correlational research that works. https://research-rebels.com/blogs/get-research-done/the-beginner-s-guide-to-descriptive-correlational-research-that-works

Salandanan, G. G., & Tan, M. T. (2021). Challenges in the implementation of the STE program in selected Philippine public schools. Philippine Journal of Science and Education, 2(1), 85–95.

SurveySparrow. (2023, October 11). Descriptive correlational research. https://surveysparrow.com/descriptive-correlational-research/

Tan, C., & Kim, M. (2019). The politics of STEM education in East Asia: Critical perspectives on policy and practice. Asia Pacific Journal of Education, 39(3), 289–301. https://doi.org/10.1080/02188791.2019.162899

Taylor, E. (2020). Enhancing student motivation in STEM education. Frontiers of Educational Review, 2(2), Article 11. https://doi.org/10.69610/j.fer.20200830

UNESCO. (2024). Cracking the Code: Girls' and women's education in science, technology, engineering and mathematics (STEM). United Nations Educational, Scientific and Cultural Organization. Retrieved from https://www.unesco.org/en/gender-equality/education/stem

UNESCO. (2025). Revitalizing STEM education to equip next generations with STEM competency. United Nations Educational, Scientific and Cultural Organization. Retrieved from https://www.unesco.org/en/articles/revitalizing-stem-education-equip-next-generations-stem-competency

University of Minnesota Extension. (2018). Effective communication for family-school partnerships. https://extension.umn.edu/family-engagement/communication-family-school-partnerships

Yang, D., Chen, P., Wang, K., Li, Z., Zhang, C., & Huang, R. (2023). Parental involvement and student engagement: A review of the literature. Sustainability, 15(7), 5859. https://doi.org/10.3390/su15075859

Yosuff, Muhamad Saiful Bahri. (2019). ABC of content validation and content validity index calculation. Education in Medicine Journal, 11 (2), 49–54. https://doi.org/10.21315/eimj2019.11.2.6

Yosuff, J. A. (2019). Validity and reliability of instruments for social science research. SAGE Open, 9(3), 1–10. https://doi.org/10.1177/2158244019865811

Zucker, M., McGee, H., & Khalil, D. (2024). Community-based strategies for increasing STEM access in underrepresented populations: The role of parental engagement. Journal of Community Engagement and Scholarship, 17(1), 12-27. https://doi.org/10.2139/jces.1712

Zucker, T., Mesa, M. P., DeMaster, D., Oh, Y., Assel, M., McCallum, C., & Bambha, V. P. (2024). Evaluation of a community-based, hybrid STEM family engagement program at pre-kindergarten entry. Frontiers in Education, 9, 1281161. https://doi.org/10.3389/feduc.2024.1281161

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