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Lived Experiences, Challenges, and Support Systems: A Phenomenological Study of Student Participation in the South Cotabato Division Science and Technology Fair

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Abstract

Aim: Science and technology fairs are powerful avenues for experiential learning, yet students' personal experiences remain largely underexplored. This paper aimed to explore the lived experiences of STEM students participating in the South Cotabato Division Science and Technology Fair. It sought to understand how students perceived the challenges and successes they encountered during the preparation and presentation of their projects, how they cope with these experiences, and how teachers, mentors, peers and family members influenced their journey throughout the event.

Methodology: A qualitative research methodology was employed in the study, specifically Moustakas' (1994) transcendental phenomenological design, which is grounded in Husserl's philosophical framework. Eight STEM students were interviewed using semi-structured interviews, and the data were analyzed following Moustakas' approach. Participants were selected through purposive sampling.

Results: Findings revealed that an emotional rollercoaster, personal growth, social connections, hardships and sacrifices, and a sense of accomplishment shaped students' experiences. Their motivations stemmed from external influences, recognition and achievement, learning and academic development, research purpose and scientific contribution, peer influence, and social motivation. Students faced challenges in time management, emotional regulation, fear of mistakes and criticism, and dealing with feedback but overcame them through stress management, collaboration, resilience, and a growth mindset. Teachers, mentors, peers, and families played significant roles in academic guidance, emotional and financial support, and teamwork.

Conclusion: The results of this study show that participation in the Division Science and Technology Fair (DSTF) fostered significant emotional, academic, and personal growth among STEM students. Their experiences were driven by motivation, shaped by challenges such as limited preparation time and public speaking anxiety, and supported by coping strategies like time management and emotional regulation. The presence of strong support systems from teachers, mentors, peers, and families played a crucial role in guiding students through their journey. Overall, the DSTF served as a powerful platform for developing students' resilience, research skills, and collaborative competencies.

Keywords: Lived Experiences, Resilience and Coping Strategies, Science and Technology Fair, STEM Students,

INTRODUCTION

Science and technology fairs have long been recognized for their transformative educational value, shaping students' curiosity, resilience, and academic journeys. These events provide students the opportunity to conceptualize, develop, and present research projects, offering both triumphs and challenges. While the academic benefits of science fairs are well-established, limited research exists on the lived experiences of student participants, an underexplored area of study.

Globally, science fairs align with the growing emphasis on experiential learning, positively impacting students' confidence and aspirations in STEM careers (Schmidt & Kelter, 2017; Wharton, 2019). However, many schools face resource limitations and lack institutional support, which hinder the sustainability of these initiatives.

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Gossen and Ivey (2023) emphasize that targeted funding, teacher training, and curriculum integration are essential for overcoming these barriers and ensuring that science fairs are accessible to diverse student populations.

In the Philippines, studies have highlighted challenges faced by students in science-related tasks due to limited resources. Berame (2022) discusses the struggles of senior high school students in Davao City, citing issues such as inadequate internet access and financial burdens. Similarly, Lakin et al. (2021) explores the challenges teachers face in implementing science and engineering fairs, noting that many educators feel ill-equipped due to insufficient training and support. Additionally, the Philippine K-12 curriculum does not sufficiently prioritize hands-on learning experiences, reducing opportunities for students to engage meaningfully with STEM through these fairs (Department of Education [DepEd], 2020).

In Region XII, the implementation of science fairs is hindered by inadequate preparation and limited resources. The End-of-Program Evaluation of the Basic Education Sector Transformation (BEST) Program reported that many teachers in the region face challenges in organizing science-related activities due to insufficient training and resources (Quality Education Design – Aptissimi Development Innovations Inc. [QED-ADII], 2021). Mangarin and Macayana (2024) highlight that mismanagement and improper utilization of funds contribute to the lack of laboratory facilities and equipment in many Philippine schools. This situation limits students' ability to engage in practical science learning, which is essential for fostering innovative thinking.

This study aimed to explore the experiences of students participating in the South Cotabato Division Science and Technology Fair. It sought to capture the essence of their experiences, challenges, successes, and coping strategies during project preparation and presentation. Additionally, the study examined the role of teachers, mentors, peers, and family members in shaping student engagement and support.

This study assumes that students had meaningful experiences in the South Cotabato Division Science and Technology Fair, facing challenges while using coping strategies and receiving support from teachers, mentors, peers, and family. These factors influenced their participation and learning, aligning with Constructivist Learning Theory (Piaget, 1967, as cited in Drew, 2024), which supports science fairs as a key educational tool for enhancing science learning through real-world problem solving. Teachers play a vital role in guiding students to gain the skills needed in today's technology-driven world.

The study is also grounded in Social Constructivism (Vygotsky, 1978), emphasizing the role of social interaction in learning. Science fairs provide opportunities for students to collaborate, share ideas, and deepen their understanding through group work. Teachers can use these events to foster group discussions, enhancing students' engagement in STEM education.

Additionally, Experiential Learning Theory (Kolb, 1984) reinforces this study, highlighting the value of learning through concrete experience, reflection, and experimentation. Science fairs allow students to apply these principles as they prepare and present projects, fostering critical thinking and creativity.

These frameworks underline the importance of hands-on experiences, collaboration, and real-world application in learning. With support from teachers, mentors, peers, and families, science fairs serve as powerful platforms for promoting holistic, engaging STEM education.

Objectives

This study explored students' experiences participating in the South Cotabato Division Science and Technology Fair.

Specifically, this study addressed the following questions:

1. What are the students' lived experiences in participating in the Division Science and Technology Fair?
2. How do students perceive the challenges they encountered during the preparation and presentation of their projects, and how they cope?
3. What role do teachers, mentors, peers and family members play in shaping students experiences in the Division and Technology Fair?

METHODS

Research Design

This study employed a transcendental phenomenological design, following Moustakas (1994) and grounded in the philosophical principles of Edmund Husserl, to explore the lived experiences of STEM students who participated in the South Cotabato Division Science and Technology Fair.



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Population and Sampling

Eight STEM students from Banga National High School, Libertad National High School, Tupi National High School, and Polomolok National High School in South Cotabato were purposively selected for one-on-one in-depth interviews. Participants met the following inclusion criteria: (1) currently enrolled in a public secondary school within the division; (2) had participated in the Division Science and Technology Fair (DSTF) for at least two consecutive years; (3) had engaged in at least one project category—TUKLAS—Life Science, Physical Science, Mathematics and Computational Science, Robotics and Intelligent Machines, or the Science Innovation Expo; and (4) were willing to share insights regarding the benefits and challenges of their participation.

Instrument

The study utilized an in-depth interview (IDI) guide to explore the lived experiences of STEM students participating in the Division Science and Technology Fair. The guide included background questions and open-ended prompts designed to elicit rich narratives regarding students' motivations, challenges, emotional responses, support systems, and personal reflections. To ensure content validity, the interview guide was reviewed by five science subject experts, who assessed its relevance, clarity, and alignment with the research objectives.

Data Collection

Data were collected between January and March 2025. Eligible participants were identified based on their involvement in the Division Science and Technology Fair. Formal one-on-one interviews were conducted by members of the research team in designated areas. After each interview, audio recordings were transcribed verbatim. The transcribed data were then systematically coded and prepared for analysis.

Data Analysis

The data analysis employed Moustakas' (1994) transcendental phenomenological approach to explore the lived experiences of STEM students participating in the Division Science and Technology Fair (DSTF). The process began with *epoche* (bracketing), wherein the researchers set aside personal biases and preconceptions to approach the data with neutrality. This was followed by *horizontalization*, in which all relevant statements were identified and treated with equal value. Through *reduction and elimination*, statements not directly related to the phenomenon were discarded, and the remaining ones were organized into thematic clusters, revealing recurring patterns and meanings.

Subsequently, a *textural description* was developed to articulate what participants experienced, followed by a *structural description* to explain how these experiences occurred, considering contextual and situational influences. Finally, the *synthesis of meanings and essences* integrated both textural and structural descriptions, resulting in a rich, composite understanding of the phenomenon. This analytical progression facilitated the illumination of the challenges, coping strategies, and support systems that shaped students' engagement in the science fair.

Ethical Considerations

This study adhered to the ethical standards outlined by Beauchamp and Childress (2013), which emphasize the protection of participant welfare, rights, and dignity. Informed consent was obtained through formal letters and signed consent forms, ensuring that participants were fully informed about their roles, rights, and the use of audio recordings. Participant privacy and confidentiality were protected in accordance with the Data Privacy Act of 2012 (Republic Act No. 10173) by employing identity coding and secure data handling procedures. Ethical responsibility was maintained through transparency and a commitment to research integrity.



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RESULTS and DISCUSSION

This section presents and interprets the qualitative data using Moustakas' transcendental phenomenological method, organizing the findings by essence and themes, followed by a detailed analysis of participants' experiences and their implications.

1. Lived Experiences of Students Who Have Participated in Division Science and Technology Fair

Key Dimensions Explored

Overall Experience

Motivation

Emotions

Most Exciting Moments

1.1 Overall Experience

The overall experience of the participants in the Division Science and Technology Fair revolved around five essential themes: Emotional Rollercoaster, Personal Growth, Social Connections, Hardships & Sacrifices, and Sense of Accomplishment. Each theme provides a deeper understanding of the challenges and rewards that student encountered in the competition and offers valuable insights into the significance of research fairs in student development.

Students experienced an emotional roller coaster, beginning with anxiety due to high expectations and experienced judges, but gradually gaining confidence through mock presentations and peer support. This aligns with Wharton (2019), who observed that initial self-doubt often gives way to confidence, and with recommendations from the American Academy (2020) for time management and positive self-talk. Beyond the competition, students achieved personal growth, developing public speaking, resilience, and problem-solving skills through mentorship. This reflects Morrison et al. (2020), who support project-based learning (PBL) as a means to transform theoretical lessons into meaningful experiences. Social connections also emerged, with students forming friendships and professional relationships that enhanced collaboration, consistent with findings by Esparza and Smith (2023) and Burgess et al. (2020), which emphasize the lasting benefits of peer collaboration and team-based projects. Nevertheless, hardships and sacrifices were evident, as participants faced time constraints, stress, and financial barriers, particularly affecting students from less privileged backgrounds. These challenges echo concerns raised by Amsen (2007) and Grinnell (2020) regarding time management struggles and unequal access to resources. Despite these difficulties, a strong sense of accomplishment prevailed, as students shifted their focus from prizes to growth, supporting Stanford University (2025), which emphasizes framing competitions as learning experiences to foster resilience, motivation, and scientific curiosity.

1.2 Motivations

The motivations for joining the Division Science and Technology Fair were categorized into five key essential themes: External Influences, Recognition and Achievement, Learning and Academic Growth, Research Purpose & Scientific Contribution, and Peer Influence & Social Motivation. Each theme highlights a different aspect of student engagement in academic competitions, offering valuable insights into their experiences and future implications for educational institutions.

External influences from teachers, parents, and school authorities played a pivotal role in student participation, as many were motivated by teacher encouragement, parental support, and school pride (Fields et al., 2022). Recognition and achievement through awards and certificates also inspired students to join, although American Heritage Schools (2024) caution that an excessive focus on competition can cause stress and recommend diversifying recognition to emphasize holistic development. Beyond external validation, students pursued learning and academic growth, seeking hands-on experience and enhanced STEM competencies, aligning with Kelley and Knowles (2016), who advocate for research-based learning to sustain scientific engagement. Some participants also aimed to solve real-world problems through their research, highlighting the importance of school-community partnerships for real-world relevance (Tsai et al., 2022; David J. Sencer CDC Museum, 2022). Lastly, peer influence and social motivation served as strong motivators, as collaborative environments promoted enjoyment, reduced anxiety, and strengthened teamwork, consistent with findings by Juvonen et al. (2012).



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1.3 Emotions

The emotional journey of students participating in the Division Science and Technology Fair reveals a structured pattern of pre-event anxiety, mixed emotions during the competition, and post-event relief and fulfillment. These emotional stages highlight both the challenges and benefits of engaging in academic competitions, offering insights into the psychological, social, and academic factors that influence student experiences. Understanding these emotions provides valuable implications for teachers, mentors, and competition organizers, helping them create a more supportive and growth-oriented environment for students.

Before the event, students experienced anxiety, nervousness, and self-doubt, with some reporting sleepless nights and intense anticipation, reflecting the psychological toll of high-stakes academic competitions (Mottaghi et al., 2013). During the event, emotions fluctuated between stress, excitement, and confidence, as the formal setting and presence of judges heightened the pressure, while prior experience and peer support helped build resilience (Liu et al., 2024; Li et al., 2022). After the event, most students felt relief, fulfillment, and satisfaction, recognizing the personal growth gained regardless of winning (Harris II, 2023). These experiences highlight the importance of providing support to manage anxiety, fostering emotional resilience during competitions, and emphasizing learning and personal development over outcomes.

1.4 Most Exciting Moments

The most exciting and memorable moments of the participants in the Division Science and Technology Fair revolve around four essential themes: Winning and Recognition, Social Interactions and Friendships, Overcoming Challenges and Preparation, and the Journey and Travel Experience. Each theme represents a unique aspect of their experience, showcasing the different ways students found fulfillment, joy, and meaning in their participation. These insights provide valuable implications for teachers, competition organizers, and mentors in fostering a more enriching and supportive environment for future student participants.

Winning and recognition evoked emotional responses like disbelief, joy, and gratitude, with students highlighting that personal growth mattered as much as awards (Bliven & Jungbauer, 2021). Social interactions and friendships formed during the event, often across schools, fostered camaraderie, teamwork, and mentorship, enriching the overall experience (Kulturel-Konak, 2021; Society for Science, 2016). Overcoming challenges and preparation, marked by sleepless nights and teamwork, developed resilience, time management, and collaboration skills essential for long-term growth (Neubert, 2016; Teen Coach Academy, 2024). The journey of travel, filled with nervous excitement and bonding moments, further eased anxiety and made the competition more meaningful (Lamb-Sinclair, 2018; Explorica, 2021). These experiences emphasize that valuing the process of growth, collaboration, preparation, and travel—alongside recognition—nurtures academic motivation, emotional resilience, and personal development.

2. Students Perceptions on the Challenges Encountered During the Preparation and Presentation of their Projects and How they Cope in the Division Science and Technology Fair

Key Dimensions Explored

*Biggest Challenges Encountered During the Preparation and Presentation of Projects
Strategies for Overcoming Challenges*

2.1 Participants Biggest Challenges During the Preparation and Presentation of Projects

The Division Science and Technology Fair was a challenging yet transformative experience for students, characterized by a range of obstacles that tested their resilience, adaptability, and problem-solving abilities. The participants' experiences can be understood through six essential themes: Time Management and Academic Balance, Lack of Research Experience and Knowledge Gaps, Methodological and Analytical Challenges, Financial Constraints and Limited Resources, Public Speaking Anxiety and Stage Fright and Technical Issues and Presentation Challenges, each highlighting different aspects of the challenges they faced. These themes provide insights into the complexities of academic competitions and emphasize the need for structured support systems to help students navigate these challenges effectively.

Time management and academic balance posed significant challenges for students, often at the expense of personal and family time, highlighting the importance of structured mentorship and support (Deng et al., 2022; Game Changer Tutoring Connection, 2024). Lack of research experience and knowledge gaps created feelings of unpreparedness among first-time participants, emphasizing the need for early exposure and preparatory programs

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(Amihan & Sanchez, 2023; Carvajal, et al., 2023; Ferdinand-James, 2015). Methodological and analytical challenges, such as difficulties in selecting tools, underscored the necessity of guided technical training (Martinez et al., 2021). Financial constraints and limited access to research materials and facilities pointed to the need for equitable funding and resources (Tham, 2023). Public speaking anxiety and stage fright emerged as emotional burdens, suggesting that regular practice and exposure are essential for building confidence (Gebre, 2024; ul Huda et al., 2024). Lastly, technical issues and presentation challenges disrupted delivery and increased stress, affirming the value of on-site technical support and preparation (Kim, 2012). Addressing these challenges through targeted support systems is vital to empowering students in academic competitions.

2.2 Strategies for Overcoming Challenges

The strategies on overcoming challenges in the Division Science and Technology Fair centered on five key essential themes: Emotional Regulation and Stress Control, Time Management and Organization, Faith and Mindfulness, Seeking Support and Collaboration, and Self-discipline and Growth Mindset. These themes highlight how students navigated challenges, built resilience, and developed essential life skills through the competition.

Students employed various strategies to manage stress and maintain focus during academic competitions, such as relying on emotional regulation and stress control techniques like staying calm and using systematic problem-solving (Association for Science and Autism Treatment, 2025; McGarvie, 2025). Effective time management and organization, such as planning and prioritizing tasks, were also critical in balancing academic responsibilities and research preparations (Grand Canyon University, 2024; Australian Christian College, 2024). Spiritual practices like prayer and reflection offered emotional support, highlighting the role of faith and mindfulness in managing pressure (Parsons et al., 2021; Bai et al., 2020). Seeking support and collaboration with peers, teachers, and mentors was essential for overcoming challenges and refining research, reinforcing the importance of teamwork and mentorship in academic success (Da Vinci Collaborative, 2023; University of Cincinnati, 2025). Lastly, self-discipline and a growth mindset helped students persevere through obstacles, demonstrating that emotional resilience and a positive outlook are key to academic and personal development (Geng & Wei, 2023; Zeng et al., 2016). Integrating these strategies into academic frameworks can enhance students' emotional resilience, organization, and long-term success.

3. Role of Teachers, Mentors, Peers and Family Members Play in Shaping Students Experiences in Division Science and Technology Fair

Key Dimensions Explored

Experiences with Teachers and Mentors

Experiences with Classmates and Peers

Role of Family

3.1 Experiences with Teachers and Mentors

The Division Science and Technology Fair experience was shaped by the invaluable support and mentorship provided by teachers and coaches. Their guidance can be categorized into four essential themes: Academic Guidance and Research Oversight, Hands-On Mentorship and Active Involvement, Mock Defenses and Presentation Training, and Emotional and Psychological Support. These essential themes highlight the vital role of mentorship in shaping students' academic growth, research confidence, and overall competition experience.

Academic guidance and research oversight played a crucial role in supporting students' research and personal development (Sanchez, et al., 2022). Mentors guided students through the research process, ensuring academic integrity and refining their outputs (Cutillas et al., 2023; Kulshrestha & Tyagi, 2024). Hands-on mentorship and active involvement, including late-night support and personal care, fostered engagement and motivation (Beauchamp et al., 2022; Morales et al., 2023). Mock defenses and presentation training prepared students for panel evaluations, improving their presentation and critical thinking skills (Lantsoght, 2022; Precision, 2023). Additionally, mentors provided emotional and psychological support, enhancing students' motivation and well-being (Chen & Huang, 2024; Big Brothers Big Sisters, 2024; Loseva, 2022). Schools should integrate structured mentorship programs, personalized check-ins, and mock defense sessions to promote both academic success and emotional resilience.



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3.2. Experiences with Classmates and Peers

The Division Science and Technology Fair experience was significantly shaped by the support and influence of peers. Their role can be categorized into five essential themes: Peers as a Source of Emotional and Moral Support, Peers as Motivators and Encouragers, Creating a Sense of Belonging and Camaraderie, Peers Contributing to a Fun and Memorable Experience, and Pressure and Expectations from Peers. These themes emphasize the importance of peer support in shaping students' emotional well-being, motivation, and overall competition experience.

Peers, as a source of emotional and moral support, played a vital role in students' motivation, emotional well-being, and academic success throughout the competition. Peers served as motivators and encouragers: sending heartfelt messages and motivating words helped students manage stress and boost their confidence (Shortlidge et al., 2024; Hao et al., 2025). By creating a sense of belonging and camaraderie, peer support helped alleviate feelings of isolation, especially for individual competitors (Shao et al., 2024; Ooi & Cortina, 2023). Peers also contributed to a fun and memorable experience—such as exploring the venue—which balanced the rigor of competition with social bonding (Alotaibi et al., 2023). However, perceived peer pressure and expectations also introduced stress, as students feared underperforming and disappointing their classmates (Patosa & Oclinaria, 2023; Karakos, 2014; Hall & Sverdluk, 2016). Schools should nurture a culture of peer support while helping students manage expectations, fostering both motivation and emotional well-being in competitive settings.

3.3 Role of Family

The Division Science and Technology Fair experience was deeply influenced by the support provided by students' families. This support can be categorized into four essential themes: Financial Support as an Essential Enabler, Emotional Encouragement and Motivation, Physical Assistance in Research and Preparation, and Well-being and Stress Relief Measures. These findings underscore the indispensable role of family support in shaping students' competition experiences, highlighting the significance of a strong support system in fostering academic and personal growth.

Financial support, as an essential enabler, was crucial in allowing students to participate in the DSTF competition by providing funding for travel and research materials, which reduced stress and enabled greater focus on their work (Sulz et al., 2023; Shaikh et al., 2023). Emotional encouragement and motivation from family members also boosted students' confidence, helping them manage anxiety and remain resilient (Stanford, 2023; Fathi et al., 2024). In addition, physical assistance with research preparation, such as helping with research tasks, made the workload more manageable and enhanced academic performance (Henderson & Mapp, 2015; Dearing et al., 2006). Furthermore, families supported students' well-being and stress management by alleviating household burdens and providing comfort during stressful times, which helped maintain their mental health and balance (Solved Consulting, 2024). Schools should foster family involvement to ensure students receive the emotional, physical, and financial support necessary for academic success.

Conclusions

The study reveals that participation in the Division Science and Technology Fair (DSTF) was a transformative experience for STEM students, marked by emotional intensity, personal development, and a strong sense of purpose. Students were motivated by teacher and parental encouragement, the desire for recognition, peer influence, and academic aspirations. Their emotional journey evolved from anxiety and anticipation before the event, to stress, excitement, and confidence during the competition, and ultimately to relief and fulfillment. These experiences highlight that real-world scientific inquiry, supported by a nurturing environment, fosters both academic and emotional growth.

Despite challenges like limited preparation time, balancing academic duties, lack of research experience, financial constraints, and public speaking anxiety, students coped through strategies like time management, emotional regulation, mindfulness, help-seeking, and a growth mindset. These coping mechanisms demonstrate resilience and self-regulation, emphasizing the importance of personal skills and institutional support in overcoming academic challenges. The findings stress the need to equip students with both technical knowledge and life skills for navigating complex academic environments.

The roles of teachers, mentors, peers, and family were crucial in shaping students' experiences. Teachers and mentors provided academic guidance and emotional support, peers fostered collaboration and encouragement, while families offered financial and emotional help. This highlights the importance of a strong support network for success in academic competitions. The study supports the view that well-supported science fair participation nurtures



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intellectual curiosity, emotional resilience, and collaborative competence, aligning with Constructivist Learning Theory.

Recommendations

The findings emphasize the need for structured, long-term support for students in the Division Science and Technology Fair. Given the emotional journey and challenges like limited research experience, tight timelines, and public speaking anxiety, schools should offer programs that build academic and emotional skills, such as mentorship, mock defenses, stress management workshops, and research resources. Additionally, fostering a supportive network of teachers, peers, and families ensures students feel guided, motivated, and valued. This holistic approach will strengthen resilience, enhance learning, and empower future success in scientific and academic pursuits.

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