

Future-Proofing the BSE Science Curriculum: Stakeholder Perspectives on Integrating AI and Emerging Technologies at Pangasinan State University

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Date received: November 8, 2024

Date revised: November 20, 2024

Date accepted: December 8, 2024

Originality: 95%

Grammarly Score: 99%

Similarity: 5%

Recommended citation:

Sicuan, R., Ermino, J.C., Junio, R. (2024). Future-proofing the BSE Science curriculum: Stakeholder perspectives on integrating AI and emerging technologies at Pangasinan State University. *Journal of Interdisciplinary Perspectives*, 3(1), 27-35. <https://doi.org/10.69569/jip.2024.0606>

Abstract. The rapid advancement of technology, particularly in artificial intelligence (AI) and emerging innovations, has reshaped the education landscape, necessitating the modernization of academic programs to meet future demands. This study assesses the readiness of the Bachelor of Science in Education (BSE) Science curriculum at Pangasinan State University for integrating AI and emerging technologies. Qualitative data were collected from students, faculty, the college dean, the program chairperson, and the director for curriculum to identify gaps and recommend curriculum enhancements. Key findings reveal significant curriculum limitations, including outdated content and insufficient focus on technology, hinder students' preparedness for careers in a digital world. Participants emphasized the need for practical learning experiences, such as hands-on projects and real-world applications, to bridge the gap between theoretical knowledge and practice. Faculty development in AI and digital tools was highlighted as critical for teaching effectiveness. Participants recommended incorporating AI, machine learning, and data science fundamentals to future-proof the curriculum and address institutional constraints like limited resources and infrastructure challenges. The study recommends a comprehensive curriculum overhaul that integrates advanced technologies enhances digital literacy and emphasizes professional development for faculty to align with global educational trends. These changes are essential to prepare future science educators for the dynamic demands of modern education and the evolving workforce.

Keywords: Artificial Intelligence; Career readiness; Digital literacy; Faculty development; Technological integration.

1.0 Introduction

The rapid advancement of artificial intelligence (AI) and emerging technologies presents a significant challenge for educational institutions: ensuring their curricula remain relevant in preparing students for a technology-driven world. This challenge is particularly pressing in science education, as technological advancements are reshaping both teaching methodologies and the skills required in the workforce. Despite these trends, many academic programs, particularly in developing countries, face outdated curricula, limited technological access, and a lack of alignment with global standards. These concerns necessitate an urgent re-evaluation of existing curricula to address these gaps and foster student technological readiness (John et al., 2023).

The National Higher Education Research Agenda in the Philippines underscores the need for curriculum responsiveness to labor market demands (Commission on Higher Education Memorandum Order No. 46, s. 2012).

However, studies indicate that Filipino graduates often lack digital and AI-related skills, hindering their employability in an increasingly competitive global workforce (Alvarez & Cammayo, 2023). The Bachelor of Science in Education (BSE) Science program at Pangasinan State University reflects this broader concern, facing the challenge of preparing educators with AI competencies and other technological proficiencies needed for the 21st-century classroom.

Theoretical frameworks such as Roehrig et al.'s (2022) model for STEM curriculum innovation emphasize the integration of advanced technologies to enhance student engagement and learning outcomes. Furthermore, Lamas and Arnab (2022) propose that empowering educators with AI-focused training strengthens their ability to deliver technology-integrated instruction, thus aligning educational practices with global standards. Locally, Pangasinan State University has acknowledged the importance of engaging stakeholders—students, faculty, and administrators—in assessing curriculum needs (Tolentino et al., 2020), fostering an inclusive approach to addressing these challenges.

Despite these efforts, the BSE Science curriculum still lacks adequate focus on AI and practical applications, limiting students' preparedness for the demands of modern education (Mubofu & Mambo, 2023). This study investigates whether curriculum enhancements are necessary to effectively integrate AI and other emerging technologies, thus addressing these gaps and aligning the program with the global movement toward future-ready education. By examining stakeholder perspectives, this study seeks to contribute to developing a responsive, innovative curriculum capable of meeting the instructional needs of a digitally adept generation.

2.0 Methodology

2.1 Research Design

The study employed a qualitative research design to explore the perspectives of key stakeholders regarding the need for curriculum enhancement in the Bachelor of Science in Education (BSE) Science program at Pangasinan State University. Data collection involved semi-structured interviews with three faculty members, the college dean, the program chairperson, and the curriculum director, as well as a survey questionnaire for six student participants. While the number of student participants was limited, this approach aligns with the principles of qualitative research, which emphasize depth and richness of data over sample size. Including multiple stakeholders provided a comprehensive understanding of the curriculum's relevance in advancements in artificial intelligence and emerging technologies. This methodology ensured that the study captured a range of perspectives, allowing for the identification of specific challenges and actionable recommendations to improve the curriculum and better prepare graduates for future educational demands.

2.2 Research Locale

The study was conducted at Pangasinan State University (PSU) Binmaley Campus, one of PSU's nine campuses, known for its designation as a Center of Excellence in Fisheries, highlighting its dedication to quality education and research. Located in Binmaley, a coastal town in Pangasinan, the campus fosters an educational environment that combines academic rigor with practical, hands-on learning experiences, especially in fisheries and aquatic sciences. While the campus primarily serves aspiring professionals in fisheries, it also offers diverse programs such as a Bachelor of Science in Criminology, Environmental Science, and Secondary Education, majoring in Science. This dynamic academic setting, enriched by modern facilities and a strong focus on research and community involvement, provides a relevant backdrop for exploring the need to future-proof the BSE Science curriculum by integrating AI and emerging technologies. This setting ensures that findings are grounded in a campus context that values academic excellence and practical application, offering valuable insights for advancing science education amidst technological advancements.

2.3 Research Participants

The research participants in this study consisted of 12 individuals selected to provide a comprehensive view of the BSE Science curriculum at Pangasinan State University's Binmaley Campus. The researchers employed purposive sampling to ensure that participants possessed relevant experiences and roles for assessing the curriculum. This technique was employed because it allowed for the intentional selection of participants who could provide rich, detailed insights into the study's objectives. The participants included six students currently enrolled in the BSE Science program, three faculty members who teach science courses, the college dean, the

program chairperson, and the director for curriculum. The inclusion criteria for participants required direct involvement in or experience with the BSE Science curriculum. Students were selected based on their enrollment in the program and willingness to share their experiences. Faculty members were chosen for their teaching experience in science courses, while administrative personnel were included for their roles in curriculum planning and implementation. Participants who lacked direct involvement with the BSE Science program or declined to participate were excluded. Participants retained the right to withdraw at any study stage without repercussions.

Table 1. Participants of the study

Pseudonym	Role	Relevant Details
P1-P6	Students	Current BSE Science students, varying year levels
P7-P9	Faculty Members	Science educators with relevant teaching and research experience
P10	College Dean	Head of the College
P11	Program Chairperson	Responsible for teaching supervision
P12	Director for Curriculum	Aligns curriculum with industry trends

2.4 Research Instrument

The study employed multiple data collection methods, utilizing a survey questionnaire for the six student participants to gather detailed insights into their experiences and perceptions of the BSE Science curriculum. For the faculty members, the college dean, the program chairperson, and the curriculum director, in-depth interviews were conducted to capture their professional insights on the curriculum's current structure and the potential need for integrating AI and emerging technologies. This combination of survey and interview methods provided a comprehensive understanding of the curriculum's effectiveness from multiple perspectives.

2.5 Data Gathering Procedure

The data-gathering procedure for this study will begin with securing the necessary permissions from Pangasinan State University's administration and relevant departments. Once approval is granted, the researchers will distribute survey questionnaires to the six student participants, ensuring that each participant is informed of the study's purpose and their right to confidentiality. The questionnaire will be structured, allowing students to provide quantitative responses and open-ended feedback on the BSE Science curriculum. Following the student surveys, in-depth interviews will be scheduled with the three science faculty members, the college dean, the program chairperson, and the curriculum director. Each interview will be semi-structured, allowing for flexibility in exploring participants' insights into curriculum relevance, technological integration, and areas needing enhancement. All interviews will be audio-recorded, with participants' consent, to ensure accuracy during data analysis. After data collection, responses from the questionnaires and interviews will be carefully reviewed and coded to identify common themes, supporting the study's aim of assessing curriculum adaptability in the face of emerging technologies.

2.6 Ethical Considerations

Ethical considerations were carefully observed throughout the study to ensure the protection and dignity of all participants. Informed consent was obtained from each participant before data collection, ensuring they fully understood the purpose, procedures, and rights within the study. Participants were assured of the confidentiality and anonymity of their responses, with all data securely stored and personal identifiers removed during transcription and analysis. Participation was voluntary, and participants were informed they could withdraw from the study without any consequences. Additionally, the study adhered to all institutional and legal guidelines concerning research with human subjects, ensuring that ethical standards were maintained at every stage of the research process.

3.0 Results and Discussion

3.1 BSE Science Curriculum's Readiness for Technological Advancements

The effectiveness of the BSE Science curriculum was evaluated by gathering insights from key stakeholders, including students, faculty, and administrators. Their perspectives provided a holistic view of how well the current curriculum prepares students for the demands of a technology-driven world, particularly in integrating AI and related advancements.

Table 1. BSE Science curriculum's readiness for technological advancements

Participants	Themes	Sub-theme/s
P1, P2, P3, P5, P7, P8	Curriculum Gaps	Lack of tech focus, Outdated Content
P2, P6, P9, P10, P12	Curriculum Enhancement	Future Career Skills, Future-Proofing
P4, P6, P8	Curriculum Gaps	Hands-on Learning, Future-Oriented Content
P7, P8, P10, P11, P12	Implementation Challenges	Resource Needs, Faculty Training
P9, P10, P11, P12	Relevance of AI	Career Relevance, Job Market Readiness

Curriculum Gaps (Lack of Tech Focus, Outdated Content)

Participants consistently identified gaps in the curriculum, particularly in its lack of focus on technology and outdated content. P1 remarked,

"The curriculum does not include much about AI or modern science tools, and I feel unprepared for future careers in technology-driven fields." P1

"Some topics are outdated, and current advancements like AI are not mentioned." P3

"The curriculum meets the basics but does not align with technological progress, leaving students underprepared." P7

These insights indicate a disconnect between the curriculum and technological advancements, underscoring the urgent need for modernization. According to Mubofu and Mambo (2023), addressing curriculum gaps is critical for aligning with global industry demands. The findings also align with Roehrig et al. (2022), who highlight the importance of continuously updating STEM curricula to reflect technological progress. This gap suggests that the curriculum is not adequately preparing graduates for the demands of AI-driven science education, a concern that must be addressed to remain competitive.

Curriculum Enhancement (Future Career Skills, Future-Proofing)

The need for curriculum enhancement was a recurring theme, as participants emphasized the importance of equipping students with skills that align with a technology-driven job market.

"We need more exposure to AI and data science – skills that are essential for future careers." P6

"The curriculum needs to integrate AI and modern technologies to future-proof our graduates for industry demands." P10

This aligns with Alvarez and Cammayo's (2023) findings, which emphasize that incorporating AI-related content enhances employability by providing relevant skills for the workforce. Furthermore, John Melchor et al. (2023) highlight that integrating AI fosters adaptability, allowing graduates to navigate the evolving technological landscape. By focusing on future-proofing the curriculum, these enhancements can prepare students for lifelong learning and career readiness, addressing the growing need for a workforce skilled in emerging technologies. These findings directly address the research objective of identifying gaps and opportunities for enhancing the BSE Science curriculum to prepare graduates for technology-driven careers. The identified themes provide actionable insights into areas requiring immediate attention, such as modernizing content and integrating AI and related technologies.

3.2 Challenges in Technology Integration within the BSE Science Curriculum

Understanding the challenges faced in integrating modern technologies into the BSE Science curriculum sheds light on the barriers hindering its effectiveness. Insights from stakeholders helped uncover limitations in resources, training, and curriculum structure that affect technology adoption.

Table 2. Identified challenges in technology integration within the BSE Science curriculum

Participants	Themes	Sub-theme/s
P1, P3, P4, P5, P7, P9	Curriculum Limitations	Limited Access to Technology, Outdated Resources
P2, P4, P6, P10, P11	Need for Practical Applications	Lack of Hands-on Activities, Insufficient Real-World Relevance
P3, P5, P8, P11, P12	Training and Skill Gaps	Limited Faculty Skills in Technology, Need for Faculty Development
P6, P9, P10, P12	Student Preparedness	Insufficient Exposure to AI, Lack of Technological Skills
P7, P8, P11	Institutional Constraints	Resource Limitations, Infrastructure Challenges

Curriculum Limitations (Limited Access to Technology, Outdated Resources)

Participants highlighted significant curriculum limitations, citing restricted access to modern technology and reliance on outdated resources.

"We do not have access to advanced tools or updated learning materials that align with current technological trends." P1

"Students often lack exposure to technology that is standard in today's educational and professional environments." P7

These insights reflect broader challenges educational institutions face, where outdated resources hinder the integration of global competencies (Alvero, 2023). Mubofu and Mambo (2023) emphasize that investment in technological resources is critical for aligning curricula with modern educational demands, addressing a key barrier to technological adoption in the BSE Science curriculum.

Need for Practical Applications (Lack of Hands-on Activities, Insufficient Real-World Relevance)

Participants stressed the lack of practical applications in the curriculum, which limits students' ability to bridge theoretical knowledge with real-world experiences.

"We need more hands-on activities that show us how science concepts apply in real life." P2

"Practical projects are vital for preparing students to handle real-world scenarios." P10

Wu and Yang (2022) support this observation, emphasizing that hands-on learning enhances understanding and retention of complex concepts. Roehrig et al. (2022) advocate for curriculum designs incorporating real-world relevance, making learning more effective and applicable.

Training and Skill Gaps (Limited Faculty Skills in Technology, Need for Faculty Development)

Participants identified faculty development as a critical issue, noting gaps in technological proficiency among educators.

"Some teachers are not trained in using advanced tools, which limits their ability to teach modern technologies." P3

"Faculty need continuous training to stay updated with advancements like AI." P8

Lameras and Arnab (2022) highlight the importance of empowering educators through professional development to enhance their capacity for integrating emerging technologies. Such training enables teachers to deliver high-quality education and better prepare students for future technological demands (Virgoles et al., 2020).

Student Preparedness (Insufficient Exposure to AI, Lack of Technological Skills)

Participants expressed concerns about students' lack of readiness for technology-driven careers.

"Many students have limited exposure to AI and other technologies, which puts them at a disadvantage." P9

"Technological skills are critical, but the current curriculum does not provide enough opportunities to develop them." P12

This aligns with findings by John Melchor et al. (2023), who emphasize the importance of technological proficiency for career success. Alvarez and Cammayo (2023) also note that exposing students to relevant technologies throughout their education enhances their readiness for an evolving job market.

Institutional Constraints (Resource Limitations, Infrastructure Challenges)

Participants also pointed to institutional constraints, such as insufficient resources and infrastructure, as major barriers to technology integration.

"The lack of infrastructure, like computer labs, limits what we can teach and learn." P7

“Our institution struggles with resource allocation, which affects the implementation of new technologies.” P11

These challenges are echoed by Miranda and Cruz (2023), who note that resource limitations in institutions significantly impact the quality of education. Addressing these structural barriers is critical to creating a supportive environment for technology-enhanced learning. These findings address the objective of identifying challenges in integrating modern technologies into the BSE Science curriculum. The key themes—curriculum limitations, lack of practical applications, faculty skill gaps, student unpreparedness, and institutional constraints—highlight specific barriers and provide insights into areas requiring targeted interventions to improve the curriculum’s effectiveness.

3.3 Perceptions of AI and Emerging Technologies in Science Education Careers

Identifying areas for improvement within the BSE Science curriculum is crucial to ensure its relevance in a rapidly advancing technological landscape. Stakeholders’ responses highlighted key gaps and opportunities for curriculum enhancement that can better align the program with global education standards.

Table 3. Perceptions of AI and emerging technologies in science education careers

Participants	Themes	Sub-theme/s
P1, P2, P3, P5, P7	Perceived Career Relevance	Enhancing Teaching Methods, Improving Student Engagement
P4, P6, P9, P10, P12	Curriculum Support Deficiencies	Insufficient Skill Development, Lack of AI Content
P3, P8, P10, P11, P12	Need for Skill Alignment	Career-Ready Skills, Technological Proficiency
P6, P8, P9, P11	Professional Growth Opportunities	AI Training Workshops, Continuous Learning Needs
P7, P10, P12	Future Educational Impact	Preparing for Digital Classrooms, Building Adaptability

Perceived Career Relevance (Enhancing Teaching Methods, Improving Student Engagement)

Participants highlighted the relevance of AI and emerging technologies in improving teaching methods and increasing student engagement.

“AI can make lessons more interactive, which keeps students interested and helps them understand better.” P1

“It would be great if the curriculum taught us how to use these tools to make our teaching more effective.” P5

These insights align with John Melchor et al. (2023), who emphasize AI's potential to enrich instructional strategies and foster dynamic, engaging learning environments. This recognition underscores the transformative impact of AI on traditional science education, highlighting its role in creating interactive, technology-enhanced experiences.

Curriculum Support Deficiencies (Insufficient Skill Development, Lack of AI Content)

Participants expressed concerns about the curriculum's deficiencies, particularly its failure to develop essential skills and include AI-related content.

“We are not learning enough about technologies that are shaping the future of science education.” P6

“The lack of AI content in the curriculum makes it difficult for students to gain relevant skills for their future careers.” P10

This aligns with Lamas and Arnab’s (2022) findings, which stress the importance of integrating AI to support skill development and meet the demands of a technology-driven workforce. Addressing these deficiencies is crucial to equipping students with the tools and knowledge needed for the evolving job market.

Need for Skill Alignment (Career-Ready Skills, Technological Proficiency)

Participants emphasized aligning the curriculum with industry requirements to ensure students develop career-ready skills and technological proficiency.

“The curriculum should include specific skills that align with what employers are looking for, especially in science and technology.” P11

“We need to learn practical skills to make us competitive in a tech-focused job market.” P8

This supports the findings of Alvarez and Cammayo (2023), who note that aligning academic learning with industry needs enhances employability and ensures graduates possess relevant career competencies.

Professional Growth Opportunities (AI Training Workshops, Continuous Learning Needs)

Participants highlighted the need for professional development opportunities to ensure educators are prepared to teach emerging technologies.

“Workshops and continuous training on AI would help teachers stay updated and improve their teaching methods.” P9

“It is important for teachers to keep learning to teach new technologies effectively.” P6

Virgoles et al. (2020) emphasize that continuous learning initiatives are essential for adapting to technological advancements, benefiting educators and students by enhancing instructional quality.

Future Educational Impact (Preparing for Digital Classrooms, Building Adaptability)

Participants recognized the impact of AI and technology on the future of education, particularly in preparing for digital classrooms and fostering adaptability.

“Teachers need to be ready for digital classrooms where technology plays a key role in teaching and learning.” P12

“Adaptability is essential for educators to thrive in rapidly changing educational settings.” P7

These findings align with Wu and Yang (2022), who stress the importance of preparing educators to manage technology-enhanced learning environments. Incorporating adaptability and AI into the curriculum ensures that future educators are equipped to meet the challenges of increasingly digitalized classrooms. These findings address evaluating the curriculum’s capacity to prepare students for careers in science education, focusing on technological proficiency and future educational practices. The themes highlight the importance of aligning the curriculum with industry demands, fostering skill development, and equipping students and educators for a technology-driven future.

3.4 Recommendations for Enhancing the BSE Science Curriculum

Based on the findings, actionable recommendations were developed to address the identified gaps and challenges. These recommendations focus on integrating AI, modern technologies, and skill-based approaches to equip students for careers in science education while addressing the evolving demands of the 21st century.

Table 4. Participant recommendations for enhancing the BSE science curriculum

Participants	Themes	Sub-theme/s
P1, P2, P3, P4, P5	Recommended Curriculum Additions	AI and Machine Learning, Data Science Fundamentals
P4, P6, P7, P8, P12	Need for Practical Learning	Hands-on Technology Projects, Real-World Application
P3, P5, P9, P10, P11	Enhancing Digital Literacy	Digital Tools Proficiency, Computational Thinking
P6, P8, P11	Faculty Development Needs	Training on Emerging Technologies, Continuous Professional Development
P7, P10, P12	Career-Driven Skills	Classroom Technology Management, Preparing for Technological Advancements

Recommended Curriculum Additions (AI and Machine Learning, Data Science Fundamentals)

Participants suggested incorporating AI, machine learning, and data science fundamentals into the curriculum to enhance technological competencies.

“Adding AI and data science would make the curriculum more relevant to modern needs.” P1

“These skills are essential for scientific research and practical applications today.” P5

This aligns with the findings of Roehrig et al. (2022), who advocate for including cutting-edge technological content to meet evolving industry standards. John Melchor et al. (2023) further highlight the importance of such

additions in fostering a forward-thinking curriculum that equips students for future challenges in science education.

Need for Practical Learning (Hands-on Technology Projects, Real-World Application)

Participants emphasized integrating hands-on technology projects and real-world applications into the curriculum.

"Projects that let us use technology practically would help us understand its real-world relevance." P4

"Students learn better when they can apply concepts to real-life situations." P8

Wu and Yang (2022) confirm that experiential learning enhances engagement and knowledge retention, while Mubofu and Mambo (2023) stress the need to bridge the gap between theory and practice. Incorporating practical learning ensures that students can use technology meaningfully in science.

Enhancing Digital Literacy (Digital Tools Proficiency, Computational Thinking)

Participants highlighted the need to enhance digital literacy through proficiency in digital tools and computational thinking.

"Digital literacy is foundational, and the curriculum should teach us how to use technology effectively." P10

"Skills like computational thinking are crucial for solving modern problems." P9

Alvarez and Cammayo (2023) and Lamas and Arnab (2022) both emphasize the critical role of digital literacy in equipping students for academic and professional success. Strengthening these competencies can ensure that students are prepared for technology-driven environments in science education and beyond.

Faculty Development Needs (Training on Emerging Technologies, Continuous Professional Development)

Faculty development emerged as a priority, with participants calling for training on emerging technologies and opportunities for continuous professional growth.

"Teachers need training to stay updated and effectively teach new technologies." P6

"Continuous development for faculty is vital to ensure the curriculum keeps pace with technological advancements." P11

This aligns with Virgoles et al. (2020), who emphasize that investing in faculty development enhances teaching quality and curriculum delivery. Miranda and Cruz (2023) also underscore the importance of faculty preparedness in managing advanced technological content.

Career-Driven Skills (Classroom Technology Management, Preparing for Technological Advancements)

Participants suggested emphasizing career-driven skills such as classroom technology management and preparing for technological advancements.

"Future teachers must know how to use and manage technology in the classroom effectively." P7

"The curriculum should prepare students for advancements that will shape the teaching profession." P12

Tolentino et al. (2020) emphasize that equipping educators with these skills ensures they are adaptable and capable of meeting the demands of a tech-driven educational landscape. Alvero (2023) reinforces the need for such skills to foster a workforce ready to respond to modern challenges. These findings address the objective of identifying actionable recommendations for enhancing the BSE Science curriculum. The themes highlight specific areas of improvement, such as integrating advanced technologies, emphasizing practical learning, enhancing digital literacy, and prioritizing faculty development. These recommendations aim to equip graduates with the skills and knowledge necessary to thrive in a technology-driven educational environment.

4.0 Conclusion

The findings of this study revealed critical areas in need of attention within the BSE Science curriculum at Pangasinan State University, particularly concerning its readiness for technological advancements. Significant gaps, such as limited focus on AI and outdated content, hinder the curriculum's ability to prepare students for careers in a rapidly evolving, technology-driven environment. These deficiencies highlight the pressing need to modernize the curriculum by incorporating relevant technological advancements and aligning it with global standards and industry demands.

In addition to curriculum gaps, stakeholders identified challenges restricting the effective integration of modern technologies into the program. Limited access to technology, outdated resources, insufficient hands-on applications, and faculty skills and infrastructure gaps emerged as significant barriers. These findings underscore the necessity for targeted interventions, including resource investment, infrastructure upgrades, and continuous professional development for educators, to create a more supportive learning environment. Furthermore, the study emphasized the need to equip students with career-ready skills and technological proficiency, which is currently lacking in the curriculum. Participants highlighted the importance of aligning academic learning with industry requirements by integrating digital literacy, computational thinking, and AI-related competencies. Such efforts are essential to enhance graduates' employability and ensure relevance in a competitive, technology-driven workforce. To address these gaps and challenges, actionable recommendations have been proposed to future-proof the curriculum. These include integrating advanced technologies such as AI and data science fundamentals, enhancing hands-on learning opportunities, and prioritizing faculty training on emerging technologies. By focusing on career-driven skills like classroom technology management and adaptability, the curriculum can better prepare graduates to navigate the dynamic demands of modern science education. These enhancements will collectively ensure that the BSE Science curriculum evolves into a forward-looking program that meets local and global education standards.

5.0 Contributions of Authors

This study was a collaborative effort among the three authors, who each played a distinct and vital role in ensuring its success. Mr. Sicuan led the study's conceptualization, overseeing the research design and the development of objectives to align with the study's aims. Ms. Ermino managed data gathering and coding, organized participant responses, and systematically analyzed data to extract meaningful insights. Ms. Junio took primary responsibility for writing, editing, and synthesizing the findings into a coherent narrative. The authors engaged in thorough discussions at every stage, from initial planning to final reporting, demonstrating a shared commitment to the study's integrity and quality. This collective approach highlights the authors' combined expertise and dedication to advancing the BSE Science curriculum through meaningful research.

6.0 Funding

All expenses related to this study were financed solely by the authors. No external funding or financial support was received for this research.

7.0 Conflict of Interests

The authors indicated that there are no conflicts of interest in the publication of this paper.

8.0 Acknowledgment

The authors want to express their deepest gratitude to Almighty God for His guidance, strength, and blessings throughout this research journey. Our sincere appreciation goes to our families, whose unwavering support and encouragement provided a strong foundation for our work. We are grateful to our colleagues and mentors, whose invaluable advice and insights helped refine our study and contributed to its successful completion. We would also like to extend our heartfelt thanks to the participants and administration at Pangasinan State University for their cooperation and openness, which were essential in gathering meaningful data for this research. Finally, we are grateful to friends and fellow researchers for their encouragement and support, which inspired us to persevere and bring this study to fruition.

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