Innomathive: Its Efficiency in Teaching Mathematics for Pre-Service Teachers

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Abstract

This study investigated the extent to which the Innomathive device was validated in pre-service mathematics teacher education, focusing on its functional suitability, usability, and efficiency. Functional suitability referred to the alignment of the device's features with instructional needs; usability encompassed interface layout, ease of installation and operation; and efficiency included aspects such as internet stability, visibility, and duration of use on power. The study also identified challenges encountered and areas for improvement in utilising the device to support teaching and learning. A mixed-methods research design was employed, involving 31 fourth-year pre-service mathematics teachers during the second semester of the 2024–2025 academic year. Participants used the device during classroom simulations and micro-teaching sessions. Quantitative data were collected using a structured four-point Likert-scale survey, while qualitative data from focus group discussions and interviews were analysed through thematic analysis. The findings indicated that functional suitability achieved a weighted mean of 3.90, classified as excellent, while usability and efficiency recorded weighted means of 3.62 and 3.58, respectively, both also classified as excellent. Participants highlighted the device's modularity, intuitive interface, and operational effectiveness, although challenges such as connectivity issues, configuration difficulties, and limited multi-support features were reported. Suggested improvements included enhanced network options, extended battery life, and improved display connectivity. Overall, the study concludes that the Innomathive device is a highly valid and effective instructional tool for pre-service mathematics teacher education, with strong potential to support innovative teaching practices. The findings further suggest that its integration into practicum experiences may contribute to more technology-enhanced and effective mathematics instruction.

Keywords: Innomathive, functional suitability, usability, efficiency, pre-service teachers, educational technology

Introduction

The nature of mathematics education continues to change, primarily due to technological advancements; hence, teachers and students engage with mathematics differently. The integration of technology into teacher education curricula is essential for pre-service teachers, as it helps them acquire the skills they need to use digital tools in future classrooms.

"Innomathive" is a combination of "innovation" and "mathematics." It seeks to make possible innovative uses of new educational technologies in teaching mathematics. This approach aligns with the worldwide modernisation of teaching methodologies, ensuring that all pre-service teachers are equipped with essential skills to teach in a digitised learning environment (Mistretta, 2015).

The integration of technology in mathematics education has been widely studied, showing clear potential to improve students understanding, problem-solving abilities, and overall engagement. Frameworks such as Technological Pedagogical Content Knowledge (TPACK) emphasise the importance of systematically preparing teachers to use technology in ways that support, rather than distract from, their instructional goals (Mishra & Koehler, 2006). Without such preparation, pre-service teachers may default to superficial uses of digital tools, simply clicking through apps or launching videos without thoughtful integration, resulting in lessons that neither deepen conceptual understanding nor foster critical thinking. Innomathive addresses this gap by embedding reflective prompts, alignment checklists, and scaffolded lesson-planning modules, all designed to help future educators critically assess how each technology choice advances specific learning objectives.

A core strength of Innomathive lies in its curated selection of interactive, research-backed tools. Platforms like GeoGebra allow students to dynamically manipulate geometric constructions, while virtual manipulatives make algebraic relationships tangible through on-screen sliders and visual models (Hohenwarter & Lavicza, 2007). AI-driven tutoring systems offer personalised hints and step-by-step feedback that adapts to each learner's pace and style (VanLehn, 2011). Moreover, Innomathive integrates well-established repositories, such as NCTM Illuminations and PhET simulations, into its workflow to facilitate seamless lesson integration (Perkins et al., 2015). By prioritising tools with strong empirical support, the programme ensures that technology becomes a catalyst for inquiry and exploration rather than a mere novelty.

Assessment and feedback are built into the very fabric of Innomathive's design. Pre-service teachers learn to use dashboards that visualise class-wide performance in real time, flagging common misconceptions and highlighting individual learning gaps. This continuous formative assessment empowers instructors to pivot on the spot by providing targeted mini-lessons or scaffolded practice before misconceptions become entrenched. At the same time, the framework includes guidelines for equitable deployment, offering strategies for sharing limited devices, leveraging low-bandwidth alternatives and designing inclusive activities that accommodate students with disabilities or unreliable internet access. These provisions help ensure that technological innovation serves all learners rather than exacerbating existing inequities.

Finally, Innomathive aligns closely with Philippine educational policies. The Enhanced Basic Education Act of 2013 (RA 10533) promotes 21st-century skills such as digital literacy, critical thinking, and collaborative problem-solving, while measures like Senate Bill 1159 aim to further integrate information technology into curricula. By combining scaffolded professional development, communities of practice, and built-in monitoring, Innomathive equips pre-service teachers not only to adopt digital tools but also to transform their teaching, bridging policy and classroom realities and fostering student-centred mathematics experiences that extend beyond any single workshop or device.

Statement of the Problem

The primary aim of this study is to determine the device-level validity of the Innomathive device in terms of functional suitability, usability, and efficiency in supporting pre-service teachers during instruction. The device also facilitates students' engagement with mathematical applications by providing internet connectivity through a SIM card. In addition, this study seeks to examine the perceived validity of the Innomathive device among fourth-year pre-service mathematics teachers. Specifically, it aims to address the following research questions:

1. What is the perceived level of validity of the Innomathive device in terms of:
    - Functional suitability
    - Usability
    - Device efficiency
2. What challenges are encountered when using the Innomathive device?
3. What recommendations can be proposed to further enhance the Innomathive device?

Methodology

Methods of Research

This study employed a descriptive–evaluative research design using a mixed-methods approach. The descriptive design was utilised to determine the levels of functional suitability, usability, and efficiency of the Innomathive device based on the perceptions of fourth-year mathematics pre-service teachers. An evaluative design was also applied to assess the overall quality and effectiveness of the device as an instructional tool in pre-service mathematics teacher education. Specifically, a quantitative method was used to evaluate the device for functional suitability, usability, and efficiency via a structured Likert-scale questionnaire. A qualitative method was employed to thematically analyse the consolidated feedback from focus group discussions and interviews regarding users' experiences, challenges encountered, and suggested improvements to the device.

Research Instrument

The study used a researcher-developed questionnaire to gather feedback from respondents on the Innomathive device and its effectiveness for teaching and learning mathematics. The questionnaire evaluated three key areas, which are functional suitability, usability, and device efficiency, using a four-point Likert scale where 4 = Excellent, 3 = Average, 2 = Below Average, and 1 = Poor. Functional suitability assessed the completeness, correctness, and appropriateness of the device's functions, while usability examined ease of recognition, learnability, operability, user error protection, interface aesthetics, and accessibility. Device efficiency focused on practical considerations such as projection quality, setup speed, internet connectivity, collaboration capability, battery life, and flexibility during continuous use. The questionnaire was reviewed and validated by experts, and reliability testing yielded a Cronbach's alpha of 0.804, indicating good internal consistency and confirming its suitability for evaluating the Innomathive device.

An open-ended section was included in the questionnaire to allow respondents to provide more detailed and qualitative feedback. This section allowed participants to share their personal observations, elaborate on the strengths and weaknesses they encountered, and propose additional features or improvements that could enhance the device's functionality and effectiveness. To ensure the questionnaire was clear, relevant, and fully aligned with the studys objectives, it was carefully reviewed and validated by a panel of experts. Their evaluation confirmed that the instrument was appropriate and reliable for assessing the usability, functional suitability, and overall performance of the Innomathive device in supporting mathematics teaching and learning.

Population, Sample Size, and Sampling Technique

This study was intended for the thirty-one (31) fourth-year Bachelor of Secondary Education Mathematics (BSEd Math) students in the College of Education at Camarines Norte State College (CNSC-CoEd), who were actively engaged in teaching practice during the Second Semester of the Academic Year 2024–2025. The researchers were granted permission by the college dean to include all these students as respondents. The pre-service teachers involved in the teaching-learning process with the Innomathive device served as the best representatives for determining the devices efficiency. This group aimed to investigate the extent to which the device was useful and efficient for instructional delivery and how it enhanced the learning experience in mathematics.

Since the respondents comprised the entire population of fourth-year BSEd Mathematics students, the study captured comprehensive feedback from their actual teaching experiences, providing meaningful insights into the device's usability, efficiency, and suitability for teaching mathematics. Fourth-year students were selected in particular for their extensive knowledge of pedagogical challenges and real-world teaching experience, which enabled them to offer valid, informed observations on the Innomathive device.

Participation in the study was entirely voluntary, and informed consent was obtained from all respondents. Respondents were assured that their responses would be kept confidential, thereby upholding ethical standards throughout the research process.

Description of the Respondents

The respondents of this study were fourth-year pre-service teachers enrolled in the Bachelor of Secondary Education, major in Mathematics, at Camarines Norte State College – College of Education. As future educators with experience in teaching internships, lesson planning, and classroom management, they are the primary users of the Innomathive device. Their familiarity with educational technology and digital tools enables them to effectively evaluate the device's suitability for mathematics instruction, including its usability, efficiency, and relevance. Given their background and hands-on experience, the respondents are well-positioned to provide informed feedback. They are well-suited to accurately assess the device's impact on teaching methodologies, student engagement, and the overall quality of mathematics instruction.

Data Therapeutic Procedure

The researchers' data-gathering procedure of this study started with a systematic observation of the Innomathive device to identify its functionalities, limitations, and efficiency in delivering mathematics instruction. During this process, the researchers examined the device across various teaching scenarios and took detailed notes on its performance, features, and potential challenges. The results of the observation showed that the device's battery endurance lasted 10 hours or more, while its internet speed averaged 27 Mb download and 19 Mb upload. These findings provided baseline data on the device's reliability and overall effectiveness. The conclusions from the observation were presented to the respondents to guide them in using the device effectively.

Next, the researchers prepared a letter addressed to the college dean of CNSC-CoEd requesting approval to conduct the study, particularly to survey the fourth-year BSEd Mathematics pre-service teachers. Upon receiving approval, all thirty-one (31) fourth-year students were invited to participate as respondents. The researchers presented the gathered data to the respondents regarding the performance of the Innomathive device to assess its functional suitability, usability, and efficiency. The researchers also provided the devices instructional manual and shared their initial observations to help respondents understand its features and capabilities.

After the presentation, respondents completed a Likert-scale survey to report their experiences, and an open-ended section captured qualitative feedback, such as suggestions and observations. The researchers summarised and analysed the data using statistical tools, ensuring confidentiality in accordance with Republic Act 10173 (Data Privacy Act of 2012) by coding responses to protect participant identities. This approach provided reliable quantitative and qualitative data on the device's usability, efficiency, and its impact on teaching methods, student engagement, and overall mathematics instruction.

Statistical Treatment of Data

After the data were collected, appropriate statistical tools were used to analyse both the quantitative and qualitative information obtained in the study. A four-point Likert scale was employed to measure respondents' perceptions of the Innomathive device, with the following verbal interpretations: 4 – Excellent, 3 – Average, 2 – Below Average, and 1 – Poor. Descriptive statistics, including frequency counts, percentages, and weighted means, were used to summarise and interpret respondents' evaluations of the device with respect to functional suitability, usability, and efficiency. Additionally, the grand mean was computed to provide an overall measure of the respondents' perceptions toward the Innomathive device. Qualitative responses from the open-ended section were carefully reviewed and categorised to complement the quantitative findings, providing a more comprehensive understanding of the device's strengths, areas for improvement, and practical impact on teaching and learning.

To determine the reliability and internal consistency of the modified questionnaire, Cronbach's alpha was calculated, yielding 0.804, indicating good internal consistency and confirming its suitability for evaluating the Innomathive device and ensuring that the items measured the intended constructs. Qualitative data gathered from the open-ended questions were analysed using thematic analysis, wherein responses were carefully reviewed, coded, and grouped into emerging themes. These themes highlighted common observations, strengths, weaknesses, and suggestions related to the use of the Innomathive device. The integration of quantitative and qualitative analyses provided a comprehensive basis for interpreting the findings and drawing valid conclusions regarding the device's effectiveness in mathematics instruction.

Results and Discussion

Level of Device Validity

Table 1 presents the level of device validity based on users' feedback on the Innomathive device's functional stability, usability, and efficiency. These dimensions assess how well the device supports teaching and learning in mathematics, particularly for pre-service teachers, and provide a basis for evaluating its effectiveness in educational settings.

Functional Suitability. This aspect focuses on the device's ability to perform multiple tasks simultaneously, its alignment with the instructional goals it was designed to support, and its appropriateness for use in real-world teaching environments. It assesses whether the device can efficiently meet the demands of mathematics instruction by providing relevant functions and features that enhance lesson delivery and student engagement. High ratings suggest the Innomathive device suits educational purposes, while low ratings indicate it may need improvement to meet pre-service teachers needs.

Table 1

Pre-service Teachers Perception of the Level of Device 's Validity in terms of Functional Suitability

	Indicators	Weighted Mean	Interpretation
1.	Functional completeness - Degree to which the set of functions covers all the specified tasks and user objectives.	3.87	Excellent
2.	Functional correctness - The degree to which a product or system provides the correct results with the needed degree of precision.	3.94	Excellent
3.	Functional appropriateness - Degree to which the functions facilitate the accomplishment of specified tasks and objectives.	3.90	Excellent
	Overall Weighted Mean	**3.90**	**Excellent**

Rating Scale:

(3.51 – 4.0) Excellent, (2.51 – 3.5) Average, (1.51 – 2.5) Below Average, (1.00 – 1.5) Poor.

Table 1 presents the weighted means of pre-service teachers' perceptions of the device's validity regarding functional suitability. The three indicators scored 3.87, 3.94, and 3.90, respectively, each classified as excellent. The overall mean of 3.90 also falls into the excellent category, indicating that the device's functional suitability is excellent.

This strong functional suitability indicates that the device effectively supports teaching and learning, making it a valuable tool for classroom instruction. By performing its intended functions accurately and appropriately, the device enhances mathematics lesson delivery and student engagement, particularly for pre-service teachers. This finding aligns with Hillmayr et al. (2020), whose meta-analysis of 92 studies since 2000 reported a significant positive effect of digital tools on student outcomes in secondary mathematics and science, with an effect size of 0.65 and a p-value below 0.001.

Pre-service teachers perceive the Innomathive device as highly functional, as shown by the consistently excellent ratings across all measures of functional suitability, usability, and efficiency. This indicates that the device reliably performs its intended tasks, enhancing instructional delivery, facilitating student engagement, and supporting a more interactive learning experience. These findings align with research showing that classroom technology can improve learning outcomes and teaching practices. The strong positive perceptions suggest that the device has significant potential to enhance mathematics instruction by combining pedagogical effectiveness with technological efficiency.

Table 2 features the device usability. To assess the overall usability of the system, the researchers will analyse six essential attributes: the recognizability of appropriateness, learnability, operability, user error protection, and user interface aesthetics, and accessibility that define how effectively and satisfactorily users can interact with the device.

Table 2

Pre-service Teachers Perception of the Level of Device 's Validity in terms of Usability

Indicators	Weighted Mean	Interpretation
1. Appropriateness recognizability- Degree to which users can recognise whether a system is appropriate for their needs.	3.71	Excellent
2. Learnability- Degree to which a system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.	3.74	Excellent
3. Operability- Degree to which a system has attributes that make it easy to operate and control.	3.65	Excellent
4. User error protection- The degree to which a system protects users against making errors.	3.48	Average
5. User interface aesthetics- Degree to which a user interface enables pleasing and satisfying interaction for the user.	3.65	Excellent
6. Accessibility- Degree to which a system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.	3.52	Excellent
Overall Weighted Mean	**3.62**	**Excellent**

Rating Scale:
(3.51 – 4.0) Excellent, (2.51 – 3.5) Average, (1.51 – 2.5) Below Average (1.00 – 1.5) Poor.

Table 2 presents pre-service teachers' perceptions of the device's usability validity. The first indicator scored 3.71, and the next five scored 3.74, 3.65, 3.48, 3.48, 3.65, and 3.52, respectively. With an overall weighted mean of 3.62, the device's usability validity is rated as excellent, indicating that pre-service teachers find it highly usable.

This high usability indicates that the Innomathive device is easy for pre-service teachers to learn and integrate into teaching and learning contexts. While the device itself is user-friendly, foundational knowledge of technological tools remains important for educators to maximise its potential. Regular, targeted ICT training can help reinforce these skills, ensuring teachers are confident and competent in using such digital tools effectively. Robles (2023) emphasises the value of ongoing training sessions to address specific instructional needs and empower educators, highlighting the importance of action plans within educational institutions to support the successful and sustainable integration of technology in the classroom.

Higher education instructors often face content overload, limited time for skill development, and challenges in assessing student work, which can hinder student-centred approaches. Educational technologies with strong usability can help bridge these gaps by offering flexible, interactive environments. Trinidad and Ngo (2019) argue that such tools enhance pedagogy and learning outcomes, and this study reinforces the value of intuitive devices in supporting seamless lesson delivery and improved student engagement.

Table 3 presents the efficiency of the Innomathive device, measured across six key performance indicators: user experience, setup time, internet connectivity, collaboration capability, battery endurance, flexibility, and the device's ability to operate effectively while using minimal system resources. These indicators provide a comprehensive assessment of how well the device performs in practical teaching and learning contexts.

Table 3

Pre-service Teachers' Perception of the Level of Device's Validity in terms of Device Efficiency

Indicators		Weighted Mean	Interpretation
1.	Experience – Degree to which the device can offer a quality experience in projection.	3.65	Excellent
2.	Timeliness – Degree to which the user can set up the device within a given amount of time.	3.81	Excellent
3.	ConnSection – Degree to which the users can access a decent internet connection.	3.23	Average
4.	Collaboration - The degree to which the internet connection is shared with multiple users.	3.42	Average
5.	Endurance – Degree to which a battery can last for some time.	3.84	Excellent
6.	Flexibility – Degree to which the device can accommodate consecutive workloads.	3.52	Excellent
	Overall Weighted Mean	**3.58**	**Excellent**

Rating Scale:

(3.51 – 4.0) Excellent, (2.51 – 3.5) Average, (1.51 – 2.5) Below Average (1.00 – 1.5) Poor.

Table 3 presents pre-service teachers' perceptions of the device's efficiency and validity. The six indicators scored 3.65 (excellent), 3.81 (excellent), 3.23 (average), 3.42 (average), 3.84 (excellent), and 3.52 (excellent), respectively. The overall weighted mean of 3.58 falls into the excellent category, indicating that the device's efficiency is rated as excellent.

An excellent efficiency rating indicates that the Innomathive device can enhance student engagement and contribute to a smoother, more productive learning environment, supporting both learners and teachers in achieving optimal instructional outcomes. High efficiency suggests that the device performs reliably, requires minimal setup, and allows for seamless collaboration, which can reduce disruptions and maximise classroom time. This finding is consistent with Mooers (2020), whose study of English Language Arts students in an Iowa high school demonstrated that the use of technology not only makes learning more engaging but also enables students to complete tasks more thoroughly and efficiently, reinforcing the value of well-designed digital tools in educational settings.

Likewise, Sappaile et al. (2024) report that the use of audiovisual media in elementary mathematics instruction improves student achievement. Their research shows positive effects on learning outcomes, conceptual understanding, analytical ability, and interest in mathematics, while noting the importance of mindful implementation to maximise effectiveness.

Challenges. The table below summarises six key themes, ranging from connection issues and device portability to display quality, cost concerns, limited multi-user support, and reliance on network signals, along with their frequencies, percentages, and specific challenges reported by users.

Table 4

Challenges Encountered While Using the Innomathive Device

	Theme	Frequency	Percentage (%)	Challenges
1.	Connection issues	6	33.33	Connection lags or hangs; unstable with many devices connected; and has a limited range.
2.	Device usability and portability	2	11.11	Device is large and inconvenient to carry with other equipment; the antenna is fragile when travelling.
3.	Display quality	2	11.11	Content appears blurry or pixelated during casting, and the connection drops when the phone rotates.
4.	Cost and resource concerns	1	5.56	Internet or data usage on SIM cards can be costly for many users.
5.	Limited multi-user support	4	22.22	The device struggles to connect or support multiple users simultaneously.
6.	Reliance on the network signal	3	16.67	It cannot be used effectively in areas without a signal; it depends on the SIM card signal.

Table 4 highlights several technical challenges with the device. Connection quality suffers from frequent lags, inconsistent performance when multiple devices connect, and a limited signal range. Portability and durability are also concerns: its size makes it awkward to carry, and the antenna's brittleness poses a risk during transport.

Users additionally reported display issues such as blurry video, pixelation when casting, and interruptions when changing phone orientation. Running multiple connections simultaneously often fails to meet acceptable standards, and the device's reliance on data or SIM-based load can become costly with frequent use. In areas with poor Wi-Fi or cellular coverage, the device may not function reliably, especially in remote locations.

Despite the overall excellent valIdentity ratings, these flaws affect teaching and learning. As one respondent noted, setting up the device and casting can take time, and rotation of the phone sometimes causes hanging or pixelation. Research by Dalali and Mwila (2022) found that visual aids simplify concepts but are often underused by teachers. To address these challenges, the Ministry of Education, Science and Technology should supply adequate materials and provide seminars and training on the effective preparation and use of visual aids.

Table 5 emphasises that respondents prioritised improvements in several key areas, including connection options, multi-user support, battery life, external display connectivity, portability, and branding or intellectual property protection. In addition to these suggestions for enhancement, some respondents provided positive feedback, highlighting the device's overall strength, durability, and potential to support effective mathematics teaching and learning.

Table 5

Recommendations to Further Enhance the Innomathive Device

	Theme	Frequency	Percentage (%)	Suggestions
1.	Improve connection quality and options	7	38.89	Add alternative connection methods; support multiple SIM cards or network providers; enable 5G connectivity; improve signal strength and range.
2.	Multi-user and multi-device support	2	11.11	Enable multiple simultaneous connections; multi-display or multi-projection functionality.

	Theme	Frequency	Percentage (%)	Suggestions
3.	Battery life and device endurance	2	11.11	Increase battery life beyond 10 hours; consider heat management for longer use.
4.	Simplify connectivity to external displays	2	11.11	Allow connection to TV without an HDMI cable; reduce the need to carry extra accessories.
5.	Simplify connectivity to external displays	2	11.11	Add features to accommodate rural areas without Wi-Fi or cellular signal.
6.	Device design and portability	1	5.56	Detachable/hidden antenna for safe transport.
7.	Branding and intellectual property	2	11.11	Create a catchy device name; consider patenting or copyright

Improving device Performance starts with boosting connectivity and usability. Support for Multiple SIM cards and 5G can extend signal strength and range. Adding simultaneous multi-user and multi-display options will aid collaboration. Longer battery life and better heat management ensure longer operation. Eliminating HDMI cables simplifies external display setup, and offline functionality makes the device reliable without Wi Fi or cellular networks. A detachable or concealed antenna enhances portability, and a unique name plus patent protection bolsters branding.

These recommendations show that enhancing the device across validity dimensions is feasible. Respondent 11 noted, “Do not rely on SIM card only; make it accessible even with no signal if you can.” This challenge highlights the need for offline capabilities so that information can be delivered and shared even in areas without internet access or a cellular signal. Schiefer and colleagues (2019) observed that although the internet has transformed many aspects of human life, vast populations remain offline or have only patchy access. Their work reminds us that the potential of offline digitised information for storage, distribution, and knowledge appropriation has been largely overlooked amid the focus on online connectivity.

Expanding access to digitised information revolutionises both horizontal and vertical transmission of knowledge. Physical requirements are dramatically reduced when an entire library fits in a single pocket, making vast amounts of information more portable and accessible than ever before. Digital content is also far more affordable to acquire, and the complex logistical chains required for printing, shipping, and storing books or journals become unnecessary, even in regions without concentrated demand. Beyond mere cost and convenience, digital resources can be updated, searched, and shared with unprecedented speed, further enhancing their practical value. This broader perspective suggests that the concept of the “digital divide” should be rethought: it is no longer synonymous solely with internet access but also encompasses the availability, accessibility, and usability of offline digital resources, highlighting the importance of ensuring equitable access to both online and offline digital knowledge.

Conclusions and Recommendations

The device demonstrates excellent overall performance, with its functional suitability rated highest at a weighted mean of 3.90 and both usability and efficiency also falling within the excellent range at 3.62 and 3.58, respectively, indicating that it is highly useful, easy to use, and reasonably efficient for teaching and learning. Users reported practical challenges such as unstable connectivity, reliance on network signals, portability and display-quality concerns, cost implications, and limited support for multiple users. However, these can be addressed through strategies like offline data caching, fallback operating modes, user-centred design improvements, modular hardware options, and cost-management plans to preserve and enhance core functionality. Finally, respondents recommended enhancements to connection options and stability, multi-user support, battery life and durability, simplified external display setup, refined portable design, and clear branding with strong intellectual property protections, all of which would further strengthen the device's validity and appeal.

Pre-service teachers may adopt the device to enhance teaching and learning during their internships and explore ways to develop Innomathive further. Teachers may integrate it into lessons by refining instructional approaches, delivering content strategically, fostering interactive learning experiences, and addressing diverse student needs. Institutions may facilitate legalisation and production by managing compliance with required documentation and regulatory standards and maintaining stakeholder communication. Future researchers may focus on improving the device's portability and durability to overcome current challenges. Moreover, ongoing efforts to innovate new tools or device iterations will ensure continuous advancement and responsiveness to emerging educational needs.

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Acknowledgment

The authors would like to express their deepest gratitude to Camarines Norte State College for its generous support of this research, particularly for funding the presentation of the study. The institution's encouragement, resources, and unwavering support were critical to the successful completion of this work. The authors are sincerely grateful for the opportunity to contribute to the academic community under the guidance and auspices of such a reputable institution, which has continuously fostered an environment of learning, innovation, and scholarly excellence.

The researchers also wish to extend their heartfelt appreciation to Research Professor Jennifer S. Rubio, whose expertise, mentorship, and untiring support were invaluable throughout the entire research process. Her insightful feedback, constructive criticism, and thoughtful guidance greatly helped shape the studys direction, refine its met hodology, and enhance the overall quality of the research. The authors acknowledge that without her dedication, encouragement, and the strong support system provided by Camarines Norte State College, this achievement would not have been possible. The combined support from the institution and Professor Rubio has significantly contributed not only to the success of this research but also to the researchers professional and academic growth.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process

AI-assisted technologies, including ChatGPT and Grammarly, have been used to enhance the quality of this research paper in terms of composition, clarity, and grammatical accuracy. ChatGPT was utilised to summarise and restructure content from the original research paper, adapting it to the outline and format specified by the event host. Grammarly was additionally used to refine grammar, punctuation, and stylistic consistency throughout the text. These AI-assisted modifications were applied solely to improve readability and alignment with the required guidelines, while all original ideas, analyses, and interpretations remain the authors work.

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