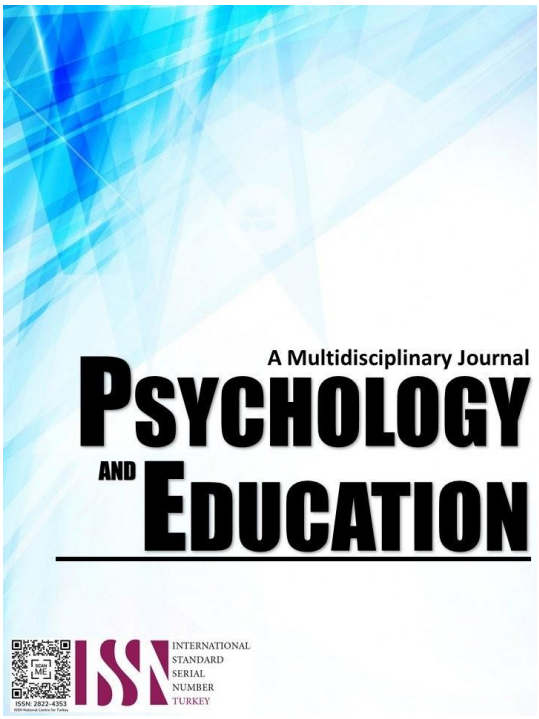
DESIGN AND DEVELOPMENT OF A TECHNOLOGY-INTEGRATED MODULE FOR EDUCATORS USING TRIPLE E MODEL



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Research Article

Design and Development of a Technology-Integrated Module for Educators using Triple E Model

Ma Liza D. Manliquez,* Arnel S. Travero
For affiliations and correspondence, see the last page.

Abstract

Technology integration transformed education, redefining the teaching and learning experience. Today's classrooms have come a long way from the days of textbooks and blackboards. This study focuses on the design and development of an instructional module aimed at enhancing faculty digital competence in technology integration within higher education. Employing a Design and Development Research (DDR) methodology and guided by the ADDIE Model, the research involved comprehensive needs assessments through stakeholder interviews and expert evaluations. The instructional module was structured to address identified gaps in faculty technology integration skills and is grounded in Kolb's Triple E Model of Engaging, Enhancing, and Extending learning experiences. Evaluation results from a panel of experts revealed that the module effectively met several key pedagogical standards, demonstrating high levels of content clarity, engagement, and appropriateness for professional development needs. Despite these strengths, the findings indicated opportunities for improvement, particularly in the areas of content inclusivity for diverse learners and the incorporation of structured self-assessment and reflection opportunities. Recommendations emerging from the study include enhancing content tailored to varied learning styles, fostering deeper reflective practices, establishing continuous feedback mechanisms, and conducting professional development sessions to support effective module implementation. This study underscores the importance of continually refining instructional resources to empower faculty in effectively integrating technology within their teaching practices, ultimately enhancing student learning experiences in the digital era.

Keywords: *digital competence, technology integration, instructional design, faculty development, Kolb's Triple E model*

Introduction

The integration of technology in education has revolutionized the teaching and learning experience, shifting from traditional, textbook-based instruction to dynamic, interactive environments enriched by digital tools (Tortola, 2024; Padilla et al., 2024; Travero & Padilla, 2025). This transformation has enhanced pedagogical practices, fostering personalized, engaging, and student-centered learning experiences. The widespread use of technology in education underscores the need to equip educators with the necessary skills to facilitate meaningful learning. However, effective technology integration extends beyond the mere use of digital tools; it requires aligning technology with pedagogical objectives to optimize student learning outcomes (Wiltermark et al., 2024). Thus, educators must be proficient in both technological and pedagogical strategies to sustain quality education in the 21st century.

Global educational frameworks emphasize the necessity of technology-integrated teaching. The United Nations' Sustainable Development Goal 4 (Quality Education) and Goal 9 (Industry, Innovation, and Infrastructure) highlight the importance of digital competence among educators. SDG 4 underscores the need for continuous professional development to ensure educators can adapt to emerging technologies (UNDESA, 2024). Without adequate training, teachers may struggle to create interactive and inclusive classrooms, ultimately limiting students' learning experiences. Similarly, SDG 9 promotes innovation by encouraging the adoption of modern teaching methodologies and digital platforms, recognizing that education must evolve alongside technological advancements (UNDESA, 2024). Educators proficient in technology integration can create more engaging and effective learning environments, bridging the gap between traditional instruction and contemporary digital learning demands.

Despite the recognized importance of technology integration, challenges persist in higher education. Studies indicate that while professional development programs have improved educators' digital skills, many training initiatives lack sustained support, limiting their long-term impact (Edouard, 2023; Karkouti, 2023; Akram et al., 2022). Faculty members often report insufficient opportunities to practice and refine newly acquired skills, leading to inconsistent classroom technology adoption. Institutional barriers such as time constraints, limited funding, and inadequate infrastructure further hinder effective technology integration (Panakaje et al., 2024). Research highlights the need for comprehensive training programs that not only develop technical proficiency but also emphasize pedagogical strategies for integrating technology into instructional design (Glover et al., 2016; Mariscal et al., 2023). Effective technology integration requires educators to move beyond basic digital skills and adopt pedagogical frameworks that enhance student engagement and learning outcomes (Arora & Chander, 2020).

In the Philippines, efforts to implement digital transformation in higher education remain a challenge due to limited access to software, hardware, and reliable internet infrastructure (Second Congressional Commission on Education, 2025). While initiatives to provide schools with digital resources are ongoing, disparities in technological accessibility persist, creating a digital divide among educators (Tortola, 2024). Research suggests that conventional technology use dominates teaching practices, with limited engagement in advanced pedagogical approaches that incorporate technology as a transformative learning tool (Morales et al., 2021). Therefore, targeted training programs emphasizing the pedagogical application of digital tools are essential to closing this gap (Bustos, 2024;

Cadiz, 2024; Tortola, 2024).

At the University of Science and Technology of Southern Philippines-Claveria (USTP-Claveria), faculty training during the COVID-19 pandemic primarily focused on the implementation of the university's Learning Management System (LMS) to support flexible learning, as mandated by CHED's Memoranda Order No. 4 and No. 6 s. 2020. These training sessions equipped faculty with essential digital skills to sustain education amidst the crisis. As conditions improved in 2022, the university adopted a hybrid learning approach, combining face-to-face and online modalities (OVPAA Memo No. 45, s. 2022). However, despite these advancements, faculty training remained largely reactive, addressing immediate instructional challenges rather than fostering long-term competence in technology integration (Akram et al., 2021). Faculty members expressed the need for continuous professional development that not only enhances technical proficiency but also deepens pedagogical knowledge to effectively integrate technology into teaching and learning processes (Kolb, 2020).

To address these challenges, this study aims to design and develop a technology-integrated module for educators using the Triple E Model. The Triple E Model (Engagement, Enhancement, and Extension) provides a structured framework for evaluating and implementing technology in education, ensuring that digital tools support active learning, deepen conceptual understanding, and extend learning beyond the classroom (Kolb, 2020). Through the alignment of the module with this model, the study seeks to provide faculty with a comprehensive, research-based training program that fosters meaningful and effective technology integration. This initiative will contribute to the enhancement of faculty competence, ultimately improving teaching practices and student learning experiences in the digital era.

Methodology

Research Design

This study employed Design and Development Research (DDR), an approach used in education, instructional design, and technology development to create, test, and refine instructional products. DDR involves a systematic investigation to establish an empirical basis for instructional materials and models. It emphasizes an iterative process in which instructional products undergo continuous refinement based on real-world implementation and feedback.

The focus of this study was on the design and development of an instructional module and the evaluation of the module by a panel of experts. To ensure a structured and systematic development process, the study utilized the ADDIE Model—Analyze, Design, Develop, Implement, and Evaluate—as a guiding framework. This model facilitated an iterative approach to instructional design, ensuring that the module was rigorously planned, developed, and evaluated. The ADDIE framework allowed for continuous feedback, enhancing the effectiveness and relevance of the instructional material.

Procedure

The research process followed the phases of the ADDIE Model of Dick et al. (2015) to guide the design, development, and evaluation of the instructional module.

The study initiated with a detailed needs assessment to acquire insights from faculty members and experts regarding their digital competence in higher education. This phase was critical for identifying instructional gaps and informing the module's content and structure. The needs assessment involved conducting interviews with experts to determine essential content areas and performing a literature review to benchmark existing training programs and best practices in technology-enhanced learning. The insights gathered from these activities established a robust foundation for the instructional module, ensuring its relevance and efficacy in addressing the needs of faculty.

Subsequent to the needs analysis, the findings informed the creation of a competence framework that shaped the structure of the instructional module. This design phase focused on defining clear learning outcomes and module-specific objectives, alongside selecting instructional strategies that corresponded to the identified needs. Additionally, the relevant materials and technologies were identified to support the module. The design integrated Kolb's Triple E Model—Engage, Enhance, and Extend—ensuring a progressive and meaningful faculty development experience. Furthermore, a Task Analysis Blueprint was developed to align the instructional content with the established learning objectives, enhancing the module's clarity, structure, and adaptability for diverse learners.

During the development phase, the instructional module was created based on the competence framework established in the design phase. The module consisted of several key topics, including "Navigating the Digital World as Responsible Citizens," which focused on digital literacy and ethical considerations; "Engaging Minds with Tech Tools," exploring various digital tools for effective teaching and learning; "Optimizing Outputs with AI Partners," highlighting the role of artificial intelligence in enhancing instructional efficiency; and "Steering Instruction with Triple E," which addressed the application of Kolb's Triple E Model in instructional design. The completed module underwent validation by a panel of experts who assessed content accuracy, clarity, and appropriateness. The evaluation criteria were adapted from existing instructional design frameworks to ensure the module's effectiveness, and feedback from the experts was incorporated into subsequent revisions to enhance its quality.

In the evaluation phase, the instructional module was rigorously assessed by a panel of four specialists, each covering relevant domains

such as content and technology, instructional design, instructional systems design, and assessment. Their collective expertise ensured that the module was pedagogically sound, technologically relevant, and effectively structured for faculty training. The evaluation process involved thorough reviews and validation, which ensured the module's alignment with pedagogical standards and its ability to meet the needs identified during the initial analysis phase and design activities. This structured approach facilitated the development of an instructional module that not only addressed the current requirements of faculty but also adhered to high standards of educational quality and technological integration.

Data Analysis

This study utilized mean and standard deviation and thematic analysis to treat data. In the needs assessment phase, thematic analysis identified challenges in technology integration, while survey data were analyzed using mean and standard deviation. In the design phase, thematic analysis guided the development of the competence framework and training modules, with statistical measures of means and standard deviation validating their effectiveness. The evaluation and feedback from the panel of experts informed the module revisions.

Ethical Considerations

The study emphasized adherence to ethical principles outlined by the University's Research Ethics Committee (REC) to ensure the integrity of the research process. A primary focus was on the respect for persons and voluntary participation, which involved treating faculty participants as autonomous individuals with the right to make informed decisions. Informed consent was prioritized, requiring transparent communication about the research's objectives, methods, potential risks, and benefits. Participants were encouraged to engage voluntarily and could withdraw from the study at any time without repercussions.

The study also adhered to principles of beneficence and nonmaleficence. Researchers aimed to enhance the well-being of participants through skill development and professional growth, while actively avoiding any harm or negative consequences associated with participation. The benefits of participating included improved teaching effectiveness and recognition for their contributions.

Finally, the principle of justice was highlighted, necessitating that the study avoided discrimination, bias, or favoritism among participants. Efforts were made to ensure that all faculty members had equitable access to training opportunities. These ethical principles were integral to maintaining fairness, transparency, and respect for the faculty involved in the research.

Results and Discussion

Analyzing the Needs of the Faculty

The analysis of the faculty's needs utilized a researcher-made questionnaire validated by experts. The questionnaire made use of the UNESCO ICT CFT Framework 2018. This framework is designed as a training tool for using ICT in education (UNESCO, 2018). It can be a foundation for teachers to define and regulate their digital and technology integration competence (Rashiva, 2023). It assessed 23 competencies across three key aspects: pedagogy, application of digital skills, and teacher professional learning. Most of these competences were mapped to the Knowledge Acquisition level of the UNESCO ICT CFT with four competencies classified under the Knowledge Deepening level. These competences focused on advanced skills such as utilizing interactive edtech applications, employing edtech tools for sharing and collaboration, applying gamification strategies, and integrating AI tools in teaching. The selection of these competences was grounded in the interview data, which contextualized the specific challenges, issues, and problems faced by the faculty regarding technology use and integration in college classes.

The ICT-enhanced teaching pedagogy aspect of the technology integration survey evaluated faculty competences in effectively integrating technology to enrich teaching and foster student-centered learning. It included six key items: selecting appropriate technology tools to support content acquisition, aligning tools with learning objectives, designing technology-based activities that enhance collaboration, communication, and creative thinking, adopting student-centered strategies using technology, and demonstrating familiarity with frameworks for technology integration. It also assessed the ability to apply these frameworks in lesson planning, ensuring purposeful use of technology to achieve instructional goals.

The application of the digital skills aspect of the technology integration survey assessed faculty proficiency in utilizing digital tools for teaching and learning. It included basic operational skills, such as operating projectors and troubleshooting technical issues, as well as productivity tasks like creating text documents, designing presentations with PowerPoint and Canva, and producing instructional videos. Advanced skills included using interactive tools like Padlet and Google Workspace for collaboration, gamification tools like Kahoot to engage students, and generative AI for lesson preparation. Moreover, it included using tools like Grammarly and ensuring academic honesty. These competencies reflected the faculty's ability to create interactive and ethical technology-enhanced learning environments. The Teacher Professional Learning aspect of the survey, focusing on digital literacy, evaluates faculty competencies in fostering responsible and ethical technology use in educational settings. It included understanding and modeling the principles of digital citizenship, emphasizing the responsible, respectful, and ethical use of technology. Key items assessed awareness of digital well-being, promoting balanced and healthy technology use in the classroom, and practicing constructive communication and respect when utilizing mobile technologies. Additionally, it highlighted the importance of adhering to digital etiquette in online interactions, ensuring

professional and respectful engagements. These competences reflected a comprehensive approach to equipping educators with the skills to navigate and teach in a digitally connected world responsibly.

The following table shows the least mastered competences of the teacher-participants as exhibited in the survey.

Table 1. *TIC Survey Results Showing Least Mastered Competencies*

Competences	*Mean*	*SD*	*Description*
Being familiar with a framework for technology integration in teaching and learning.	3.20	0.66	Moderately Competent
Devising lesson plans that follow a framework for technology integration.	3.13	0.78	Moderately Competent
Utilizing interactive edtech applications (like Padlet, Mentimeter, Socrative, and others) that encourage students to collaborate, share ideas, and communicate with others.	2.33	0.88	Less Competent
Integrating edtech tools and applications such as Google Workspace to work on activities, share mindsets, and create content among students.	2.70	0.92	Moderately Competent
Using gamification applications (such as Kahoot, Quizlet, and others) to infuse learning with fun and excitement.	2.37	0.93	Less Competent
Using generative AI to help create and prepare learning content, expound lessons, and/or supplement educational materials and learning resources.	2.93	0.91	Moderately Competent
Use appropriate technology tools and applications (like Grammarly) to ensure academic honesty and integrity in student submissions and activities.	3.13	0.78	Moderately Competent
Understanding the concept of digital citizenship.	3.03	0.93	Moderately Competent
Modeling the principles of digital citizenship.	2.83	0.83	Moderately Competent

The survey results revealed that the faculty demonstrated moderate competence in seven (7) items and least competence in two (2) items of the technology integration survey.

The area of application of digital skills had the lowest means (ranging from 2.33 to 3.13). Interactive education technology tools like Padlet and Mentimeter, and gamification applications like Kahoot and Quizlet were identified as areas of least competence. On the other hand, the faculty exhibited moderate competence in using Google Workspace tools, generative AI tools, and academic integrity tools such as Grammarly. Regarding digital citizenship, faculty members demonstrated moderate competence in understanding its concept (3.03) and modeling its principles (2.83). Also, the faculty displayed moderate competence in applying technology-integrating frameworks, specifically in familiarity with them (3.20) and in devising lesson plans that align with them (3.13).

The findings on applying digital skills indicated that the faculty members are familiar with essential productivity tools. However, they may need additional support to enhance their proficiency using interactive and engaging educational technologies that promote student participation and motivation. They may be highly skilled in some standard digital tools and technologies used in teaching. However, their moderate and low competence in emerging and advanced digital tools, including gamification, interactive applications, and AIs, suggested limited confidence in integrating these tools into teaching. This gap highlighted the need for focused training on these innovative technologies to enhance teaching practices, promote engagement, and adapt to evolving educational demands.

With technology in the classroom and the need to prepare students for the 21st century, teachers are commissioned to effectively plan for technology and pedagogy integration (Bonfiglio-Pasivich, 2018). Teachers need the knowledge, skills, and understanding to do this effectively. Developing technological skills topped the methods adhered to in professional development programs for enhancing technology integration. Davies et al. (2014) emphasized that these approaches are intended to help teachers gain experience and confidence with technology and provide them with models for how it might be used effectively. Professional development initiatives and training programs should focus on practical skills and hands-on experience to provide faculty support and enhance competence in using technology (Mariscal et al., 2023).

In a survey of EFL teachers, Liang (2021) found that among the different technologies, teacher respondents utilized traditional technologies like Microsoft Word to create and edit text and PowerPoint to make presentations; emerging technologies like Moodle to share course materials and WeChat to communicate; technological applications like SoJump & Kahoot to design in-class quizzes and gaming tools like Second Life to engage students in virtual worlds and simulations. Teachers mostly used traditional technologies to plan and deliver instructions. Their use of emerging technologies was limited to interaction with students, and their use of applied technological applications was much less frequent. They rarely implemented these relatively new and emerging technologies in the classroom to enhance students' learning experience (Liang, 2021). These teachers might need to become more familiar with emerging technologies and need more knowledge and skills to integrate them into the English classroom, leading to their less frequent use.

Amhag et al. (2019) surveyed higher education teachers' competence in using digital tools. Almost half of the respondents used a stationary computer, laptop, tablet, smartphone, and interactive boards (i.e., smart boards) in their work. The faculty's most commonly used tools and services and programs were its learning a digital student platform)Skype, Hangouts, Zoom, and Adobe Connect for communication and meetings, and other mobile applications such as Box and Google Drive. The study revealed that teacher educators should have used digital tools primarily for pedagogical purposes. Extensive and continuing pedagogical support is needed in creating digital teaching and learning environments. According to Tortola (2024), professional development should prioritize teacher opportunities focusing on technical skills and pedagogical strategies for seamless technology use. Teacher educators must understand

the potential of digital tools in education and identify the pedagogical value in their teaching and learning context (Amhag et al., 2019). Akram et al.'s (2022) research found teacher participants to have high competence in content knowledge. However, it marked their technological knowledge at the lowest level, thus acknowledging the need for guidance to update their technological skills. Their inadequacy in technological competence caused them difficulties in adopting ICT in their instructional practices.

These studies highlight the critical need for professional development initiatives prioritizing practical, hands-on training. Programs should focus on enhancing educators' technological skills and confidence while demonstrating effective models for classroom integration. Such initiatives can empower teachers to maximize the pedagogical potential of digital tools, bridging the gap between current practices and the demands of 21st-century education.

The results in digital citizenship indicated that while the faculty recognizes the importance of responsible and ethical use of technology, they can improve in consistently integrating these principles into their teaching practices. Strengthening their ability to model digital citizenship can help guide students in navigating the digital world responsibly and ethically.

There is an urgent need for training programs that equip educators with the knowledge and skills to practice digital citizenship and ethically and responsibly integrate technology into their teaching (Balbaa et al.,2023; Gómez-Trigueros, 2023; Pulijala, 2024; Atencio & Acuña, 2024). Integrating digital technologies in education has transformed teaching and learning, offering opportunities and challenges. A recurring theme in recent research is the critical need for faculty to undergo comprehensive training in the ethical and responsible use of technology.

Balbaa et al. (2023) highlighted the multifaceted ethical challenges in digital education, emphasizing educators' pivotal role in addressing these issues. They recommended ongoing professional development to empower educators to navigate the ethical complexities of digital integration. Similarly, Pulijala (2024) called for continuous professional development and regular training to ensure that technology integration is effective and ethically grounded. Being frontline implementers of technology, they must be supported in addressing issues of digital well-being along with privacy, equity, and transparency in educational technology implementation. Gómez-Trigueros (2023) revealed a gap in teacher training related to ethical knowledge despite advancements in pedagogical and technological instruction. He emphasized that understanding digital ethics is as crucial as mastering content and pedagogy. This ethical preparedness is essential for developing digitally competent educators who can foster responsible technology use among learners. Atencio and Acuña (2024) identified a lack of ethical training and institutional support as significant barriers to responsible technology use. Their findings called for an integrative approach that includes ongoing faculty training, updated policies, and collaboration to ensure that technology serves equitable and sustainable educational goals.

Adding to these perspectives, Lapuzina (2023) stressed the societal importance of understanding technology's power and potential misuse. Through mastering computer ethics, educators and society can prevent negative consequences and address moral dilemmas related to technology use. Tortola (2024) stressed the essentialness of teachers being educated on responsible technology use and promoting ethical behavior.

Collectively, these studies emphasize the urgent need for teacher training programs that ensure educators are well-equipped to handle ethical challenges, enabling them to integrate technology responsibly and effectively into their teaching.

The result in the following frameworks for ICT-enhanced teaching suggested that for the faculty to have a foundational grasp of technology integration principles, further support is needed to enhance their ability to design lessons that effectively incorporate technology to meet learning objectives. Providing more opportunities for faculty to explore and apply various technology integration models can help them develop more structured and meaningful learning experiences.

A sound framework is essential for effective technology integration in education (Bonfiglio-Pavisich, 2018; Arora & Chander, 2020; Bajracharya, 2021; Crompton et al., 2024)—these range from systemic to frameworks specific to guide the steps in lessons integrating technology. Crompton et al. (2024) introduced a systemic model addressing the limitations of traditional training, aligning technology, pedagogy, and curriculum objectives to ensure meaningful learning outcomes. Similarly, Arora and Chander (2020) stressed the thoughtful use of frameworks to integrate technology logically, enhancing learning and guiding lesson designs. Bajracharya (2021) critiqued popular technology integration models and highlighted the need for actionable steps to bridge the gap between theoretical concepts and practical classroom applications. Bonfiglio-Pavisisch (2018) underscored the importance of merging pedagogy and technology to create impactful students-centered lessons by adhering to a matrix to align instructional strategies with technology for a meaningful learning environment. These studies resonated with the survey's findings on the need for a sound framework for technology integration lessons.

Aside from emphasizing guiding frameworks, several studies highlighted the need for pedagogically grounded technology integration to enhance teaching and learning. Davies and West (2014) advocated aligning technological tools with learning goals to engage students actively. Teacher training must prioritize purposeful applications rather than the comfort of using technology. Similarly, Uslu and Usluel (2019) stressed the importance of using ICT tools to design compelling learning experiences and build better confidence for classroom application. This preparation supported smoother integration and aligned tools with educational objectives. Mariscal et al. (2023) underlined the importance of strengthening pedagogical competence in technology integration, enabling teachers to select appropriate tools, design activities suited to students' technical skills, and foster meaningful learning. Lawrence et al. (2020) extended

this by calling for theoretically informed pedagogy that used technology not as a mere substitute but as a means for innovative, transformative learning outcomes. Systematic training programs should align technology use with pedagogical theories to create student-centered approaches. Panakaje et al (2024) focused on the shift toward multimodal pedagogical strategies in higher education, highlighting the dual competency of subject expertise and innovative teaching enabled by technology. Faculty reported designing lessons aligned with objectives, staying updated in their fields, and leveraging technology for engaging and effective learning environments.

These studies advocated for a comprehensive approach to technology integration rooted in sound pedagogical frameworks and purposeful application.

Designing the Competence Framework

Based on the survey results, the faculty needed to enhance their technology integration competences in ICT-enhanced teaching, digital citizenship, interactive edtech tools, gamification apps, co-creating and sharing documents, and generative AI. These competencies form the foundation for the competence framework that directs the design of the training and development of the modules. Data from the interviews with faculty, students, administrators, and experts revealed some challenges and problems in the faculty's integration of technology in their daily classes. The two overarching major issues were administrative and instructional challenges.

The administrative category's key themes included infrastructure problems—highlighting issues like inadequate facilities, limited internet connectivity, and students' connectivity challenges—and faculty development, encompassing the need for faculty training and problems with utilizing the official LMS, USTeP.

The instructional category, on the other hand, focused on the theme of technological knowledge, covering basic technical competence (operating projection technology and MS Word utilization), multimedia integration (challenges in PowerPoint design and video productions, and using generative AI (issues on academic integrity). The second theme is technological pedagogical knowledge emphasizing the effective use of interactive learning resources and apps for student engagement. The third theme is the ethical and responsible use of technology, addressing digital well-being, ethics in technology use, and issues in responsible online communication. This structured grouping stressed the diverse challenges in both administrative and instructional dimensions, providing a comprehensive framework for addressing them.

Several studies resonated with the issues, problems, and challenges identified in this study. Vatanartiran and Karadeniz (2015), Harrel & Bynum (2018), Alvarez Jr. (2020), and Mastul et al. (2023) emphasized the multifaceted nature of these issues, underscoring the need for comprehensive solutions to support technology use in education effectively.

Vatanartiran and Karadeniz (2015) identified three main issues related to technology integration: executive, infrastructural, and instructional. Executive challenges involved poor communication and insufficient funding, infrastructural issues including no-slow-outdated technology and connectivity problems, and instructional challenges focused on lack of materials, time constraints, and gaps in readiness, particularly technological pedagogical knowledge. Harrel and Bynum (2018) stipulated that poor infrastructure, inadequate technology, and lack of sufficient professional development are external factors that limit educators' integration of technology in school. Similarly, Alvarez (2020) highlighted technological and technical support problems as key "roadblocks," where a lack of technological knowledge, hardware issues, and system malfunctions disrupt effective instruction, while Mastul et al. (2023) declared that lack of infrastructure, teacher training, resistance to change and technical difficulties are significant barriers to effective implementation of technology integration.

Other studies also identified key challenges to effective technology integration, including insufficient technological competence, inadequate infrastructure, and limited resources. Nagy and Dringó-Horváth (2024) noted that the lack of resources hindered the teachers' ability to integrate technology into their instruction. Several studies highlight the importance of training and support. Lawrence (2020) emphasized that a lack of pedagogical guidance and training leads to reluctance and feeling overwhelmed, while Edouard (2023) stressed the need for faculty development in technology proficiency. Karkouti (2023) found that foundational skills and access to digital confidence are crucial for successful integration. Teacher training is a central theme, with Jorge-Vazquez (2021) identifying it as a primary obstacle. Akram (2022) pointed to the combined effects of inadequate ICT training, infrastructure, and professional knowledge.

These studies aligned with the issues identified in this research, reinforcing the challenges educators face in technology integration. They emphasized the need to address issues on technological competence, pedagogical competence, infrastructure, resources, and comprehensive training and support for teachers.

Of the two major issues identified in the interviews conducted, instructional issues--technological knowledge, technological pedagogical knowledge, and ethical and responsible use of technology—— relate closely to the endeavors to enhance the faculty's competence in technology integration. These themes matched the survey results conducted with the faculty following the UNESCO ICT CFT, which gave the aspects of applying digital skills, pedagogy, and teacher's professional learning. These aspects' competences are infusion, ICT-enhanced teaching, and digital citizenship. These competences formed the foundation of the technology integration competence framework.

Infusion of technology is a competence emphasizing that basic ICT skills are a prerequisite for integrating technology into a teacher's duties. Educators must seamlessly and meaningfully integrate digital tools into teaching and learning (UNESCO, 2018). This necessitates a strong theoretical foundation and the ability to apply technology in instructional practice effectively. Thus, this competence lies in the intersection of knowledge (K) and skills (S). It cannot be classified as Skills only because it requires a deep understanding of pedagogical and technological principles and practical application. Skill without knowledge can lead to ineffective use of technology. ICT skills may strongly influence ICT intention use (Bras, 2018); however, ICT use may be random or disconnected from meaningful learning without knowledge of instructional strategies. Using technology is not enough; teachers must select the right tools to match them with learning goals and assess their impact. It has been indicated that teachers who lack the knowledge and skills to teach with technology would choose not to use it in their classrooms (Korucu-Kis & Ozmen, 2018). This classification ensures that technology integration is informed and practiced rather than just theoretical.

ICT-enhanced teaching encourages teachers to acquire ICT skills to support effective teaching and learning methods. This refers to effectively integrating technology into teaching and learning to improve instructional delivery, enhance student engagement, and foster deeper learning (UNESCO, 2018). This competence requires a strong theoretical foundation in technology-enhanced instructional strategies and a positive attitude toward adopting and integrating ICT in teaching to facilitate meaningful and student-centered learning experiences. This competence cannot be classified as knowledge (K) only because knowing theories and frameworks alone does not guarantee the faculty's application of ICT-enhanced teaching strategies. A positive attitude is needed to embrace and implement these approaches effectively. Although successful technology integration requires a positive attitude toward technology (Peng et al., 2024), it cannot be Attitude (A) only. Willingness to use technology is not enough, and educators must also understand the pedagogical principles and theories behind effective ICT integration (Becirovic, 2023). Since ICT-enhanced teaching requires both an openness to using technology and a strong understanding of how to use it effectively in teaching, it is placed in the intersection of Attitudes (A) and Knowledge (K).

Digital literacy competence focuses on digital citizenship and examines how teachers can develop their digital citizenship and use ICT for professional improvement**.** Digital Citizenship is a key competence emphasizing the responsible, ethical, and effective use of digital technologies in education (UNESCO, 2018). This encompasses the practical ability to engage responsibly in digital environments and the ethical commitment to responsible technology use. This classification recognizes that being a good digital citizen is about knowing the principles of online behavior and actively demonstrating responsible and ethical digital practices. Digital Citizenship cannot be classified as Attitudes (A) only because it requires practical application. Ethical beliefs alone are insufficient—a person must demonstrate responsible digital behavior. It involves active participation. UNESCO (2018) emphasized that digital citizenship is about how people engage online, not just what they believe about digital ethics. Without skills, attitudes remain passive. While attitude is a crucial foundation of digital citizenship, it must be demonstrated through action. The competence in digital literacy, focused on digital citizenship, is classified as Skills (S) + Attitudes (A), falling in the intersection between the two.

Figure 1 is the framework that guides the development of modules for the training on technology integration competence enhancement.

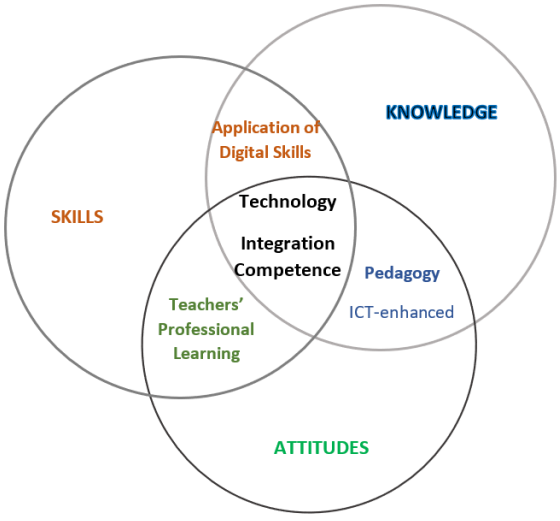

Figure 1. *Technology Integration Competence Framework*

Technology integration competence is not simply a combination of separate constructs—knowledge, skills, and attitudes—but a dynamic blend of these elements. Koehler and Mishra (2009) and Korucu-Kis and Ozmen (2018) **e**mphasize this interconnected nature in their respective frameworks on technology integration.

Koehler and Mishra's (2009) Technological Pedagogical Content Knowledge (TPACK) framework highlights how content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK) do not function in isolation. Instead, they interact and overlap,

creating the flexible understanding necessary for teachers to integrate technology into their instruction effectively. Expanding on this idea, Korucu-Kis and Ozmen (2018) present a broader perspective on technology integration by incorporating subject matter, technology, pedagogy, and a teacher's technological awareness, beliefs, and skills. This framework acknowledges that these components may appear distinct but become inseparable. A teacher's decision to use technology is not based solely on individual knowledge areas but is influenced by the complex interplay of these interconnected elements**.**

Studies by Suarez et al. (2018) and Falloon (2020) supported this claim of a complex interplay of interconnected elements. The teacher's ICT competence is the key element to using digital technology and resources in teaching (Suarez et al., 2028). Their technological and pedagogical competences and the teacher's ICT competence significantly influence their professional and instructional use of technology. Falloon (2020) has a more expanded view as his framework recognizes the interaction of three competencies: curriculum, personal-ethical, and personal-professional in the teacher's digital competence to integrate technology in teaching.

These frameworks reinforce the idea that successful technology integration requires more than technical know-how—it demands a holistic and adaptive approach in which knowledge, beliefs, attitudes, and skills continuously interact to shape instructional decisions.

Developing the Modules

Based on the framework, the training program on enhancing faculty competence in technology integration is structured around the interplay of knowledge, skills, and attitudes. The knowledge + skills component focuses on applying digital skills through various tools and activities. These include interactive applications like Padlet for collaboration, Google Docs for co-creation and content sharing, Kahoot for gamified learning, and AI tools like ChatGPT for teaching and learning enhancement. Additionally, tools like Grammarly support academic integrity in students' submissions. The skills + attitude component centers on teachers' professional learning, emphasizing digital literacy and digital citizenship to foster responsible and ethical technology use in education. Lastly, the attitude + knowledge component centers on pedagogy, specifically ICT-enhanced teaching, guided by the Technology-Integration Framework, including the Triple E Framework.

Table 2. *Components of the Training on Enhancing Faculty's Competence in Tech Integration*

Classification	*Key Aspect*	*UNESCO's Competence*	*Topics*
Knowledge + Skills	Application of Digital Skills	Infusion	Interactive applications for collaboration and communication learning activities • Padlet Edtech tools and applications for co-creation and content sharing • Google Docs Gamification applications • Kahoot AI tools for teaching and learning • ChatGPT Academic Integrity in Students' Submissions • Grammarly
Skills + Attitude	Teachers' Professional Learning	Digital Literacy	Digital Citizenship
Attitude + Knowledge	Pedagogy	ICT-Enhanced Teaching	Technology-Integration Framework • Triple E Framework

The topics in the training follow hierarchical sequencing, teaching simpler components first before moving to more complex ones, adhering to the Elaboration Theory in Instructional Design of Reigeluth (Cakiroglu & Ozturk, 2014), supporting that content organization should be presented in increasing order of difficulty, information is introduced from the simplest to the more complex. Also, the sequencing of topics and the planning of the faculty participants' activities uphold the pedagogy-first principle.

Using technology for technology's sake does not allow meaningful learning (Bonfiglio-Pavisich, 2018), so teaching with technology is about learning first and tools second (Arora & Chander, 2020). The trainees experienced the strategy in the training before the technology was chosen or introduced.

From the training syllabus, the plan for each module was developed through the Task Analysis Blueprint (TAB). The TAB covered the topics, learning outcomes, tasks and strategies, expected output, materials and applications, time frame, and references adapted from Micayabas (2017) and Ramirez (2022). The TABs are appended in Appendix F.

Module 1 tackles the topic of the Attitude + Skill component, which is on Digital Citizenship, which was offered first in training on technology integration. This commenced with the shaping of the heart to be more accepting of the prevalence of technology, its influence in teaching and learning, cultivating ethics, and living to be a responsible citizen of this digitally-driven world. The concept,

elements, and importance of digital citizenship were tackled. Faculty trainees were equipped with the rights, responsibilities, and ethics they must teach their students to navigate safely and respectfully in the digital world.

Modules 2 and 3 are the knowledge + Skills component of the training. This module is focused on enhancing the faculty's ICT integration skills in teaching and learning activities. This involved training the hands and the mind to understand and use technology tools and applications to enhance students' engagement, collaboration, and communication. The trainees' experience was highlighted by including active learning strategies paired with appropriate technology tools and applications for student collaboration, communication, critical thinking, and creativity. The trainees were refreshed on technology applications such as Padlet, Google Docs, and Kahoot and were required to complete a technology tool competence checklist at the end of each session. They were also required to reflect on their practices using these technology tools in their classes.

Module 3 dealt with AI technology such as ChatGPT and Grammarly. This module enhanced the faculty's proficiency in using these AI tools to enable them to generate diverse ideas to create various educational materials and foster a more interactive learning environment. They learned how to navigate these two powerful AI tools and explore possibilities of promoting active learning and collaboration skills in the classroom. The trainees went through an interactive workshop and guided practice to sharpen their skills in utilizing these tools. At the end of each lesson, the faculty participants were required to do a competence assessment of their competence in the use of the AI tools. Also, they were made to indicate topics in class in which they are to use the AI tools they have learned. As an extension of their learning experience, to end the session, the faculty were expected to plot the promise of these AI tools to enhance their teaching practice.

The last module, Module 4, positioned the right perspectives on the link between pedagogy and technology use, followed by the shaping of the mind (Knowledge + Attitude component). This was done so the faculty could practice integrating the learned technologies by drafting lesson plans. This module guided the faculty's technology integration endeavor by learning the Triple E Framework and exploring sample lessons. Participants were required to write a lesson plan on a topic of their field of specialization, integrating technology tools and applications. Lastly, they were asked to reflect on the suitability of the Triple E as a model to follow in preparing lessons that integrate technology.

These topics for the training are analogous to the lessons and modules of the Technology for Teaching and Learning Massive Open Distance eLearning (MODeL) Course of the University of the Philippines-Open University (UP-OU, 2024). The three courses have core lessons on using modern ICTs in teaching and learning, social and ethical responsibility in using technology tools and resources, and designing lessons using technology tools and resources. This attested to the alignment of this faculty technology integration competence enhancement to the professional development endeavor offered by the Philippines' leading university.

The task analysis blueprint warrants the modules' clarity, structure, and effectiveness. Breaking the tasks into manageable components ensures alignment with learning objectives, standards, and learner needs. The blueprint supports logical organization, identifies necessary resources, and guides appropriate instructional strategies. Timula (2024) sustained this idea and emphasized that the blueprint provides the skills and standards, instructional objectives, tasks, lesson time allocation, and relevant references.

The task analysis blueprint was designed based on the needs analysis results (Micayabas, 2017; Alava, 2017; Ramirez, 2022; Llumuljo, 2023; Segumpan, 2023; Anar, 2024). The TAB directed the development of the modules. A well-designed blueprint is a foundation for well-constructed and well-developed modules.

Modules' Instruction Design

The faculty respondents' interview data indicated their comfortable use of technology in their classes. Some indicated their use of technology centered on student engagement, enhancement of learning, and extension of learning to required tasks and activities.

Technology tools were used to activate learning as a motivation part of the lesson.

"I am comfortable using technology to align my topics, especially in icebreakers, games, and entertainment." – Participant

Some used technology in their lesson proper to aid them in the lesson's presentation, discussion, and elaboration to make students learn more efficiently and better.

"It helps my students visualize ideas, making them more engaged with our lesson." -Participant 29

Some technology was also used to prepare and make activities and task requirements for the class.

"I feel comfortable using technology in the classroom as a powerful tool for enhancing learning experiences." -Participant 19

"I integrate technology most of the time, considering that it helps create a more interactive and engaging teaching-learning process."-Participant 25

"Teaching is much easier with technology. It makes me feel confident that my students learned in a deep broader sense." -Participant 23

In some instances, technology combined students' engagement and learning enhancement, while others used it to enhance and extend learning tasks and assignments.

"Sometimes, I use technology for students' performance of an innovative task." -Participant 28

The faculty's use of technology in their classes varied from engaging students to enhancing their learning by supporting them in activities and tasks. This variation of faculty's technology use in their classes can be best guided using an ICT-enhanced teaching framework. This framework defined the experience that learners go through as technology tools are integrated into teaching and learning. To provide the faculty practice of this framework, the modules in this training adhered to the instructional design of Kolb's Triple E framework (2020) for technology integration. The Triple E Framework is a practical tool combining instructional strategies, learning goals, and purposeful technology selection. It is not a tool-centric but a learning-centered framework; the goals, not the technology, are the lesson's focus (Kolb, 2020). The ultimate rationale is learning participation, which is central to active and cooperative learning. It starts by defining the learning goals, selecting appropriate technology with pedagogy, engaging students, and connecting student learning with the real-world context (Gaer & Reyes, 2022). It has three levels: Engage, Enhance, and Extend.

The Engage phase captures faculty participants' interests and keeps them engaged in the content. The learners' engagement followed a pedagogy or strategy following the pedagogy-first principle. The trainees were prepared for the topic through an activity that allowed them to discuss their thoughts and share their ideas: gallery walk, brainstorming, jigsaw, online quiz, graphic organizer, think-pair-share.

The Enhance phase provided depth of the topics and aided, assisted, and scaffolded learning. In this phase, the faculty trainees were exposed to the content of the modules in four steps: learn, explore, experience, and check. First, they were given a lecture-discussion on the topic. There was a demonstration of how the technology tool is accessed and used. They were allowed hands-on experience through a guided workshop. Lastly, they were encouraged to do a quick recap and lay out the topic and possible technology tool applications in teaching and learning. To close this phase, the faculty must assess their competence in the technology tool and application.

The Extend phase encouraged meaningful learning where knowledge and skills gained were utilized to create new knowledge that was valuable for technology integration endeavors. In this phase, the faculty-trainees were ushered to reflect on the technology tools' strengths, promises, limitations, and challenges and plan ways of utilizing them in teaching and learning.

Experiences of UP-OU (2024) and Pratama (2022) attested to the feasibility of the Triple E framework in lesson design. The MODeL on Technology for Teaching and Learning Series (UP-OU, 2024) matched Triple E's framework in its class activities. Students were presented with videos to engage with the lessons; to further learning, discussion forums, and quizzes were required, and to extend learning, students were tasked with activities that applied their learning in their real-world teaching-learning setting. The engage-enhance-extend phases marked the design of their course. Additionally, Pratama (2022) disclosed that the Triple E framework has shown that technology use in class has effectively assisted students and teachers in meeting their learning objectives. The teacher's competence highly influences the framework's effectiveness, which reflects digital literacy and modern classroom management. After all, technology integration effectiveness goes back to how teachers design the learning activity and how they employ those parts to reach the objectives.

Content Evaluation of the Modules

The panel of experts evaluated the modules on the criteria of content and content accuracy, clarity, appropriateness, and its overall impact.

Table 3. *Summary Result of the Experts' Validation of the Modules*

Criteria	*Mean*	*SD*	*QD*	*QS*
Content and Content Accuracy	4.33	0.30	VME	Very much adequately met
Clarity	4.28	0.00	VME	Very much adequately met
Appropriateness	4.44	0.24	VME	Very much adequately met
Overall	4.35	0.22	VME	Very much adequately met

**Legend: 4.20 – 5.00 VME; 3.40 – 4.19 ME; 2.60 – 3.39 E; 1.80 – 2.59 LE; 1.00 – 1.79 NE*

The modules have high mean scores across all content and content accuracy criteria, clarity, and appropriateness. These scores showed that the modules *adequately met* all the provisions in all three criteria. The experts' overall evaluation indicated their favorable rating. The standard deviation value reflected low response variability, demonstrating that the evaluators' ratings were fairly consistent.
The consistency of the ratings, coupled with the high overall mean, indicated that the modules are thoughtfully designed and effectively meet the standards for content and instructional quality. Well-crafted instructional modules have significantly enhanced the intended learners' learning, knowledge, and understanding (Torrefranca & Rodriguez, 2017).

These modules should be user-friendly, featuring engaging content, assignments, and activities well-aligned with the targeted skills and audience (Tarmizi & Janan, 2022). Furthermore, training modules that received high satisfaction ratings in the evaluations are more likely to be highly effective in developing the skills and competencies of the intended participants (Micayabas, 2017; Alava, 2017; Segumpan, 2023; Llumuljo, 2023; Anar, 2024).

The evaluation results on the content and content accuracy indicated that the modules were highly effective in addressing content and content accuracy, as their overall mean rating was classified as *adequately met*. The modules aligned their stated learning objectives and incorporated relevant information on best practices. Comprehensive coverage of topics, activities, and exercises to enhance understanding was also noted as a strength, as these were described *as adequately me*eting these criteria. However, areas for improvement include the applicability of content to heterogeneous learners and ensuring error-free material, both of which received ratings described as *adequately met*.

The results suggested that the modules aligned highly with its objectives and effectively met expectations of content and content accuracy. The high ratings for addressing learning objectives and incorporating current and relevant advancements in technology integration reflected a strong relevance and responsiveness to contemporary educational needs. The evaluation aligned with the insights of these studies, emphasizing the importance of clear, well-formulated objectives, accurate content, and error-free instructional materials fostering effective learning experiences and addressing the diverse needs of learners.

An effective module is characterized by clear and attainable learning outcomes (Sulman et al., 2023). These outcomes should be realistic and achievable, guiding teaching and learners' progress toward intended goals. Modules designed with such clarity are more likely to foster effective learning experiences. Tugade (2016) evaluated instructional modules based on specific criteria, one of which was content characteristics. This criterion encompassed the qualities of the topics in terms of objectives, clarity, and relevance. Evaluators strongly agreed that the objectives of each lesson were clearly defined, providing explicit expectations for learners. Furthermore, the module objectives emphasized developing achievable critical and analytical thinking skills. These objectives promoted activities that foster critical thinking, making the modules engaging and intellectually stimulating for students.

Similarly, Torrefranca and Rodriguez (2017) found that the objectives in the evaluated modules were clearly stated, behaviorally framed, specific, measurable, and attainable. Evaluators strongly agreed that the objectives were carefully planned, well-formulated, organized, and relevant to each lesson's topics. The content was also found to align directly with the objectives, be presented clearly, and be supported by illustrative examples and practice tasks appropriate for the learners' level. The language used in the modules was clear, concise, engaging, and accessible, contributing to their overall effectiveness.

Yongco and Del Valle (2022) underscored the importance of instructional modules in equipping learners with essential knowledge and skills. However, their evaluation revealed that despite a satisfactory rating for content, the modules needed more topics and activities in some subject areas. Moreover, typographical mistakes and inaccuracies in the content compromised the material's intellectual and logical quality. These issues affected learners' mental engagement, potentially leading to cognitive neglect and poor academic performance. Such errors also distracted learners, disrupted focus, and caused confusion, ultimately undermining the modules' credibility and learners' confidence in their effectiveness.

These studies highlight the importance of clear, measurable learning objectives, accurate content, and engaging activities in effective instructional modules. While the modules evaluated met these standards, issues like content errors and applicability to diverse learners were identified as areas for improvement. Applicability to heterogeneous learners and freedom from errors were highlighted for further refinement with their slightly lower ratings.

This suggested a need for more inclusive content that caters to the diverse needs of learners. Overall, the results demonstrated that the modules are valuable resources, although with minor opportunities for enhancement.

Experts pointed out that the lessons could be improved in their applicability to diverse learners by specifying the heavy content of some topics in the modules and varying the content and activities for each lesson.

"Provide variations in the activities for each lesson."

"Observe variety also in the activities you are providing in the modules."

"A module may have several lessons. Perhaps you can group your content topics in one module."

"Some topics are too heavy; you might want to break them into two lesson or topics."

The primary step was grouping the modules according to themes. Three (3) modules on interactive education technology applications promoting engagement were fused into one (1) module, and two (2) modules on using AIs were fused into one module, too. Thus, instead of seven (7) modules, there are now four (4) modules.

Some modules' fusion varied the lessons and activities, making them more responsive to the learners' diverse needs. The modules were also reviewed for typographical errors and corrected, giving them a more polished look.

The evaluation results on the criterion of clarity revealed that the module's design and presentation effectively supported faculty understanding, as the overall evaluation was *adequately met*. The highest ratings were given to the content organization, clarity of language use, suitability of presentations, and integration of learning activities and examples, all of which were deemed to have met the criteria very adequately. Nevertheless, clarity of instructions and guidelines received a slightly lower rating, described as much adequately met.

These results implied that the content is well-organized and presented. The modules met the expectations in terms of logical structure, clarity of language, and the integration of learning activities and examples. The high ratings on these criteria aligned with the instructional design principles, emphasizing that content and presentation clarity are crucial for effective learning

Well-organized and presented instructional modules, with logical sequencing of topics, examples, and activities, play a vital role in enhancing clarity, promoting progressive knowledge-building, and ensuring effective learning experiences for students (Tugade, 2016; Torrefranca & Rodriguez, 2017; Yongco & Valle, 2022).

Tugade's (2016) findings underscored the importance of well-structured content, where examples and activities are presented with clear explanations and increasing difficulty levels, allowing students to grasp fundamental concepts and principles quickly. Similarly, Torrefranca and Rodriguez (2017) emphasized that the logical and sequential arrangement of topics and activities is essential for helping learners build knowledge progressively. This structure guarantees clarity, improves retention, and creates a more effective learning experience. Expanding on these insights, Yongco and Valle (2022) affirmed that instructional modules with a clear flow of ideas and an orderly arrangement of content enhance usability and facilitate meaningful insights. Well-organized materials make it easy for learners to understand and apply concepts effectively. The clarity and logical progression of lessons and topics in instructional modules are the foundation for fostering comprehension, retention, and overall engagement in the learning process.

Adding clarity to the modules, Munfaati et al. (2022) emphasized the value of incorporating visuals—such as pictures, diagrams, photos, and cartoons. These visuals make the learning process more engaging and enjoyable and aid in simplifying complex concepts, enhancing learner comprehension. On the other hand, Tugade (2016) focused on the importance of clear instructions in instructional modules. He highlighted that clear, well-structured guidance helps learners navigate the material effectively, reducing confusion and fostering better engagement, which is essential for achieving learning outcomes. These studies demonstrate that visuals enhance engagement and understanding, and clear instructions provide the necessary structure, ensuring a cohesive and impactful learning experience.

While logical structure, clarity, and engaging visuals are crucial for enhancing comprehension and retention, clear instructions and guidelines are equally essential. They provide the necessary support for learners to navigate the material effectively, ensuring a cohesive and impactful learning experience. This study's slightly lower mean for clarity of instructions and guidelines indicated an opportunity for improvement. While instructions were mostly clear, the evaluators may have needed clarification on some aspects of the instructions for activities and assessments.

This discrepancy highlighted an area of concern regarding the instructions for activities and assessments. Comments from the evaluators show this discrepancy.

"Write your directions and guidelines."

"Please supplement your textual instructions with pictures or visuals, especially when providing instructions to navigate an app or software, to ensure learners can follow the process effectively."

The modules were revisited to check on the instructions and guidelines to make them more explicit. Moreover, instructions or directions in textual forms were provided with visuals to make them clearer and easier to follow. The revisions were made to improve the ease with which the learners can engage with and complete the tasks, further enhancing the modules' effectiveness.

The evaluation on appropriateness revealed that the modules were well-designed and highly appropriate, effectively addressing the faculty's learning and professional development needs, as the overall rating is described *as very much adequately met*. The modules excelled in tailoring content to meet specific faculty requirements, engaging participants, offering hands-on, real-world applications, and promoting collaboration and connections with prior knowledge, as indicated by the description *of adequately met*. However, opportunities for self-assessment and reflection gained a slightly lower rating, described as *much adequately met.*

These evaluation results indicated that the modules fit the faculty's technology integration needs. The high ratings for tailoring content, fostering engagement, and incorporating real-world applications reflected the modules' effectiveness in aligning with current educational demands and the professional context of the faculty participants. Moreover, the high ratings for promoting collaboration and building connections with prior knowledge highlighted the modules' ability to support interactive and contextually relevant learning experiences. The low scores for self-assessment and reflection suggested the need for structured opportunities for faculty to engage in reflective practices that deepen their learning.

The findings of the study resonated strongly with the perspectives presented by Tugade (2016), Torrefranca and Rodriguez (2017), and Tongco and Valle (2022), emphasizing the appropriateness and effectiveness of the instructional modules. The modules' high ratings for addressing the faculty's learning and professional development needs align with Tugade's (2016) assertion that well-designed modules adapt to diverse learning contexts and foster independence. Similarly, the modules' ability to engage participants, promote collaboration, and connect new knowledge with prior understanding echoed Torrefranca's (2017) emphasis on fostering active learning and motivation. Yongco and Valle's (2022) focus on providing adequate time and contexts for knowledge application is also evident, as the modules excelled in offering hands-on, real-world learning opportunities. However, the slightly lower ratings for opportunities for self-assessment and reflection manifested the ongoing need to integrate the principles highlighted by Mallillin et al. (2024),

Darmiany et al. (2024), and Seden et al. (2023). These researches advocate for including self-paced exploration, reflective learning, and self-assessment in instructional design to promote deeper understanding, self-regulation, and evaluative judgment. While the modules effectively addressed content relevance and engagement, strengthening self-assessment and reflective practices could further empower faculty to internalize learning and enhance professional growth. These insights highlighted the importance of balancing content appropriateness with reflective and self-assessment opportunities to create transformative learning experiences.

While the experts agree that the opportunities for self-assessment and reflection were present and adequate, this score was lower than the other criteria, suggesting room for enhancement in this area. The evaluator's comment provided direction in the revision.

"Provide a space or activity where you can reflect as indicated in the learning outcomes; provide prompts and guides."

The modules were reviewed to address this concern and provide reflection prompts and activities. By enriching this reflection aspect, the modules were able to promote deeper learning better and provide more opportunities for students to reflect on their progress and understanding.

Conclusions

The study successfully developed and evaluated an instructional module aimed at enhancing faculty members' digital competence in technology integration within higher education. Through a systematic Design and Development Research approach utilizing the ADDIE Model, the module was designed based on comprehensive needs assessments involving stakeholder interviews and expert evaluations. The resulting instructional resources were rigorously refined, ensuring alignment with best practices and pedagogical principles.

The evaluation outcomes indicated that while the instructional modules were effective and met several key standards, such as content organization, clarity of presentation, and engagement, they also revealed opportunities for improvement. Some content areas were identified as needing refinement to enhance inclusivity and applicability for diverse learner needs. Furthermore, while the modules provided sufficient opportunities for self-assessment and reflection, scores suggested that this aspect could benefit from further enhancement to deepen learning experiences.

Based on the findings of this study, the following recommendations are proposed:

Tailor instructional materials to ensure they cater to a variety of learning styles and competencies. This could involve further describing complex topics and varied activities to meet diverse learner needs more effectively.

Incorporate additional prompts, reflection activities, and spaces for self-assessment within the modules. This would encourage faculty members to engage in deeper self-reflection and professional growth.

Establish continuous feedback loops from faculty who utilize the instructional module. Regular input will provide insights into how the modules can be improved and adapted over time, addressing any emerging challenges in technology integration.

Conduct workshops and training sessions focused on the implementation of the module, emphasizing not only content delivery but also pedagogical strategies that foster active learning and effective technology use in the classroom.

Encourage further research exploring the long-term impacts of the module on faculty teaching practices and student learning outcomes, as well as examining variations in technology integration competence across different faculty demographics.

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Affiliations and Corresponding Information

Ma Liza D. Manliquez
University of Science and Technology of Southern Philippines – Philippines

Arnel S. Travero
University of Science and Technology of Southern Philippines – Philippines