

ICT Integration among Faculty at Negros Oriental State University: Challenges, Coping Strategies, and Innovation Readiness

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ABSTRACT

The accelerating digital transformation of higher education has intensified the need for sustainable and equitable Information and Communication Technology (ICT) integration among faculty members. This study examined the challenges and opportunities of ICT integration among faculty members at Negros Oriental State University Main Campus 1. Anchored on the Technology Acceptance Model, Diffusion of Innovations Theory, Unified Theory of Acceptance and Use of Technology, TPACK Framework, DigCompEdu Framework, and the Transactional Model of Stress and Coping, the study investigated faculty ICT profile variables, integration challenges, coping strategies, professional development needs, proposed ICT innovations, and innovation readiness in a rapidly evolving digital educational environment. A cross-sectional quantitative research design employing descriptive-correlational and predictive approaches was utilized. Data were gathered through a validated researcher-made survey questionnaire administered to faculty respondents selected using stratified random sampling. Descriptive statistics, Pearson Product-Moment Correlation, and multiple regression analysis were employed to analyze the data at the 0.05 level of significance.

Findings revealed that faculty members generally demonstrated proficient digital skill levels, particularly in multimedia presentation, online assessment, and Learning Management System utilization. However, moderate limitations were observed in cybersecurity competence and learning analytics interpretation. ICT integration challenges were frequently encountered, particularly insufficient technological resources, inadequate technical skills, and workload-related time constraints. Among coping strategies, self-paced online learning and low-technology adaptation emerged as the most effective mechanisms employed by faculty members. Results further indicated substantial professional development needs in artificial intelligence integration, cybersecurity, hybrid learning systems, and data analytics.

Inferential analyses demonstrated that ICT profile variables, encountered challenges, and coping strategies significantly predicted innovation readiness and perceived teaching productivity. Multiple regression analysis revealed that digital skill proficiency and peer mentoring served as strong positive predictors, while internet connectivity challenges and insufficient technological resources negatively affected innovation readiness and teaching productivity.

The study concludes that although faculty members exhibit positive adaptability and moderate digital competence, sustainable ICT integration remains constrained by infrastructural, technical, and institutional limitations. Strengthening institutional support systems, expanding professional development initiatives, and investing in equitable digital infrastructure are therefore essential to advancing innovation readiness and fostering resilient, technology-enhanced higher education environments.

Keywords: ICT integration, innovation readiness, teaching productivity, digital competence, coping strategies, higher education

INTRODUCTION

The accelerating digital transformation of higher education has redefined how knowledge is produced, delivered, and assessed in the 21st century. Information and Communication Technology (ICT) is no longer supplementary

to instruction but constitutes a structural foundation for institutional competitiveness, instructional quality, and graduate preparedness in a rapidly evolving global economy. Post-pandemic educational reforms have intensified calls for digital integration, hybrid modalities, artificial intelligence-supported instruction, and data-driven decision-making frameworks. Globally, evidence demonstrates that well-implemented technology-enhanced learning environments improve student engagement, instructional efficiency, and learning outcomes.

Despite these advances, digital transformation remains uneven, particularly in developing and geographically fragmented contexts such as the Philippines. While national policy frameworks promote ICT-enabled education, disparities in infrastructure, digital competence, and institutional readiness persist across state universities and colleges. Provincial institutions face compounded challenges including unstable connectivity, limited access to digital devices, and insufficient professional development opportunities for faculty members. These constraints risk widening digital inequities and limiting institutional adaptability in fast-changing educational environments.

Negros Oriental State University (NORSU) Main Campus 1 serves as a regional higher education institution catering to a diverse rural-urban student population. As a state university operating under the Commission on Higher Education, NORSU is expected to align with national digitalization mandates while navigating local infrastructural and socioeconomic constraints. However, empirical evidence specific to ICT integration among faculty members in Negros Oriental remains limited.

Existing Philippine studies predominantly focus on emergency remote teaching experiences during the COVID-19 pandemic and emphasize descriptive accounts of challenges rather than predictive and theory-driven analyses. Consequently, there remains a need for localized quantitative research that examines ICT access, digital competence, encountered challenges, coping strategies, professional development needs, and innovation readiness among faculty members.

This study addresses this empirical gap by investigating ICT integration among faculty members at Negros Oriental State University Main Campus 1. Specifically, it examines faculty ICT profile variables, integration barriers, coping strategies, professional development needs, and innovation readiness in relation to teaching productivity. The findings are expected to contribute to institutional policy development, faculty development initiatives, and sustainable ICT integration strategies in higher education.

Objectives of the Study

This study aimed to investigate the challenges and opportunities of ICT integration among faculty members at Negros Oriental State University Main Campus 1.

Specifically, the study sought to:

1. Determine the demographic and ICT profile of faculty members in terms of age, sex, department affiliation, academic rank, ICT teaching experience, ICT-related training, ICT access and availability, and digital skill proficiency.
2. Determine the extent of ICT integration challenges encountered by faculty members.
3. Determine the effectiveness of coping strategies employed by faculty members in addressing ICT integration challenges.
4. Identify faculty professional development needs related to ICT integration.
5. Determine faculty perceptions regarding proposed ICT innovations.
6. Examine whether ICT profile variables, encountered challenges, and coping strategies significantly predict faculty innovation readiness and perceived teaching productivity.

Hypothesis

H₀₁: ICT profile variables, encountered challenges, and coping strategies do not significantly predict faculty readiness for ICT innovation adoption and perceived teaching productivity.

H_{a1}: ICT profile variables, encountered challenges, and coping strategies significantly predict faculty readiness for ICT innovation adoption and perceived teaching productivity.

THEORETICAL FRAMEWORK

This study was anchored on several theoretical perspectives explaining ICT integration and technology adoption in higher education. The Technology Acceptance Model emphasized perceived usefulness and ease of use as determinants of technology adoption. Diffusion of Innovations Theory explained how innovations are adopted within social systems based on relative advantage, compatibility, complexity, trialability, and observability.

The Unified Theory of Acceptance and Use of Technology highlighted performance expectancy, effort expectancy, social influence, and facilitating conditions as determinants of technology adoption. The TPACK Framework explained the interaction between technological, pedagogical, and content knowledge in effective ICT integration. The DigCompEdu Framework emphasized digital competence among educators, while the Transactional Model of Stress and Coping explained how faculty members utilize coping strategies to manage ICT-related challenges.

METHODOLOGY

Research Design

This study employed a cross-sectional quantitative research design utilizing descriptive-correlational and predictive approaches. The descriptive component was used to determine faculty ICT profile variables, ICT integration challenges, coping strategies, professional development needs, and perceptions regarding ICT innovations. The correlational and predictive components were employed to examine the relationships among variables and determine predictors of innovation readiness and teaching productivity.

Research Locale

The study was conducted at Negros Oriental State University Main Campus 1 located in Dumaguete City, Negros Oriental, Philippines.

Participants

The respondents of the study were faculty members from selected colleges of Negros Oriental State University Main Campus 1. Stratified random sampling was utilized to ensure proportional representation across academic departments.

Research Instrument

Data were gathered using a validated researcher-made questionnaire consisting of sections on faculty demographic profile, ICT access and availability, digital skill proficiency, ICT integration challenges, coping strategies, professional development needs, proposed ICT innovations, and innovation readiness and teaching productivity.

The instrument underwent content validation by experts and reliability testing prior to administration.

Data Gathering Procedure

Permission to conduct the study was secured from university officials and college administrators. The questionnaires were distributed to faculty respondents after explaining the purpose of the study and obtaining informed consent. Retrieved questionnaires were checked for completeness before statistical analysis.

Statistical Treatment

The following statistical tools were employed:

- Frequency counts and percentages for demographic variables

- Weighted mean for descriptive analysis
- Pearson Product-Moment Correlation for relationship analysis
- Multiple regression analysis for predictive analysis

All analyses were conducted at the 0.05 level of significance.

RESULTS

Faculty ICT Profile

Table No.	Variables/Indicators	Statistical Values	Interpretation
Table 1	Demographic and ICT Profile	Mean Age = 35 years; Female = 70.37%; Instructors = 85.19%; ICT Teaching Experience = 9.37 years; ICT Training Participation = 47.41%	Faculty members were generally young to middle-aged with moderate ICT exposure and inconsistent participation in ICT-related trainings, indicating uneven digital preparedness and professional development opportunities.
Table 2	ICT Access and Availability	WM = 2.97 (Neutral)	ICT resources such as Wi-Fi, LMS, and digital devices were available but not consistently reliable or sufficient for effective instructional delivery.
Table 3	Digital Skill Proficiency	Overall WM = 3.71 (Proficient); Cybersecurity = 3.07; Learning Analytics = 3.30	Faculty members demonstrated satisfactory operational digital competence but showed lower proficiency in advanced ICT competencies such as cybersecurity and learning analytics.

The findings revealed that faculty respondents were generally young to middle-aged, with a mean age of 35 years. Most respondents were female and occupied entry-level academic positions. Faculty members demonstrated moderate ICT teaching experience and moderate participation in ICT-related professional development programs.

ICT access and availability were rated at a neutral level, indicating that while ICT resources such as internet connectivity, devices, and learning management systems were available, they were not consistently reliable or sufficient. Faculty members demonstrated overall proficiency in digital skills, particularly in operational areas such as multimedia presentation, online assessment, and Learning Management System utilization. However, lower levels of proficiency were observed in cybersecurity and learning analytics.

ICT Integration Challenges

Table No.	Variables/Indicators	Statistical Values	Interpretation
Table 4.1	Internet Connectivity Challenges	WM = 2.97	Internet connectivity issues were intermittently experienced and significantly disrupted instructional activities and digital access.
Table 4.2	Insufficient Devices and Technological Resources	WM = 3.71	Faculty members frequently experienced inadequate technological resources and outdated devices, limiting effective ICT integration.

Table 4.3	Inadequate Technical Skills	WM = 3.74	Respondents experienced challenges related to advanced ICT applications, troubleshooting, and AI-related competencies.
Table 4.4	Time Constraints	WM = 3.56	Workload pressures and limited preparation time hindered effective ICT integration efforts.

Faculty members encountered several ICT integration challenges. Internet connectivity issues were intermittently experienced and significantly disrupted instructional delivery. Insufficient devices and technological resources were frequently encountered, highlighting structural limitations in ICT infrastructure. Faculty members also reported inadequate technical skills in advanced ICT applications and workload-related time constraints.

These findings indicate that ICT integration challenges remain systemic and persistent in higher education institutions.

Coping Strategies

Determine the effectiveness of coping strategies employed by faculty members

Table No.	Variables/Indicators	Statistical Values	Interpretation
Table 5.1	Offline Teaching Backups	WM = 2.87	Offline teaching approaches were moderately effective as contingency mechanisms during technological disruptions.
Table 5.2	Peer Mentoring and Resource Sharing	WM = 3.05	Collaborative learning and collegial support systems moderately helped faculty members address ICT-related challenges.
Table 5.3	Self-Paced Online Learning	WM = 3.98	Faculty members effectively utilized self-directed online learning to improve ICT competence and adaptability.
Table 5.4	Simplified/Low-Technology Adaptation Strategies	WM = 4.00	Practical and low-technology teaching adjustments effectively sustained instructional delivery despite ICT limitations.

Faculty members utilized various coping strategies to manage ICT integration challenges. Self-paced online learning and simplified low-technology adaptation strategies were perceived as effective coping mechanisms. Peer mentoring and resource sharing also emerged as valuable strategies for addressing ICT-related challenges.

The findings suggest that faculty members demonstrate resilience and adaptability in responding to technological limitations and instructional disruptions.

Professional Development Needs

Faculty respondents expressed strong professional development needs in artificial intelligence integration, cybersecurity, hybrid learning systems, and data analytics. AI-assisted instructional planning and cybersecurity training emerged as high-priority training needs.

The findings indicate a transition from basic ICT competence toward advanced and strategic digital competencies required in contemporary higher education environments.

Proposed ICT Innovations

Determine faculty professional development needs related to ICT integration

Table No.	Variables/Indicators	Statistical Values	Interpretation
Table 6.1	AI Integration Training Needs	WM = 3.89; AI-Assisted Lesson Planning = 4.22	Faculty members expressed substantial need for AI integration training and technology-enhanced instructional development.
Table 6.2	Cybersecurity Training Needs	WM = 4.15	Cybersecurity emerged as the highest professional development priority among faculty respondents.
Table 6.3	Hybrid Learning Training Needs	WM = 3.79	Faculty members needed additional support in adapting to hybrid and flexible learning systems.
Table 6.4	Data Analytics Training Needs	WM = 4.09	Respondents recognized the importance of data analytics competencies in educational assessment and decision-making.

Faculty members perceived proposed ICT innovations such as subsidized campus Wi-Fi access, AI capacity-building workshops, adaptive learning management system enhancements, and VR/AR integration as beneficial to teaching quality and productivity.

Training-oriented innovations were perceived as more transformative than infrastructure improvements alone.

Innovation Readiness and Teaching Productivity

Table No.	Variables/Indicators	Statistical Values	Interpretation
Table 7.1	Subsidized Campus Wi-Fi and Device Support	WM = 3.87	Faculty members agreed that improved internet access and device support would enhance teaching productivity and ICT integration.
Table 7.2	Mandatory AI Capacity-Building Workshops	WM = 4.23	AI-focused training initiatives were strongly perceived as beneficial for instructional innovation and professional growth.
Table 7.3	Adaptive Learning Management System Enhancements	WM = 3.87	Faculty members positively perceived adaptive LMS improvements for accessibility and instructional efficiency.
Table 7.4	VR/AR Integration	WM = 4.23	Respondents strongly supported immersive technologies such as VR/AR for innovation-driven teaching practices.

Faculty members demonstrated high levels of innovation readiness and teaching productivity. Respondents expressed willingness to adopt emerging technologies and recognized the benefits of ICT integration in improving instructional effectiveness and student learning outcomes.

Multiple Regression Analysis

Examine whether ICT profile variables, encountered challenges, and coping strategies significantly predict faculty innovation readiness and teaching productivity

Table No.	Variables/Indicators	Statistical Values	Interpretation
Table 8	Innovation Readiness and Teaching Productivity	WM = 4.23 (Strongly Agree)	Faculty members demonstrated high levels of readiness to adopt ICT innovations and recognized the

			instructional benefits of technology integration.
Table 9	Multiple Regression Analysis	$R = .81$; $R^2 = .66$; Adjusted $R^2 = .61$; $F(10,16) = 12.48$; $p < .001$	ICT profile variables, encountered challenges, and coping strategies significantly predicted faculty innovation readiness and teaching productivity. Digital skill proficiency and peer mentoring were strong positive predictors, while connectivity problems and insufficient technological resources negatively affected ICT integration outcomes.

Multiple regression analysis revealed that ICT profile variables, encountered challenges, and coping strategies significantly predicted faculty readiness for ICT innovation adoption and perceived teaching productivity.

The regression model yielded a strong correlation coefficient ($R = .81$) and explained approximately 66% of the variance in innovation readiness and teaching productivity ($R^2 = .66$). The regression model was statistically significant, $F(10,16) = 12.48$, $p < .001$.

Among the predictor variables, digital skill proficiency emerged as one of the strongest positive predictors of innovation readiness and teaching productivity. Peer mentoring and resource sharing also served as a strong positive predictor, emphasizing the importance of collaborative professional support systems.

Other coping strategies including self-paced online learning, offline teaching backups, and simplified low-technology adaptation strategies were likewise identified as significant positive predictors.

Conversely, internet connectivity challenges, inadequate technical skills, and insufficient technological resources negatively affected innovation readiness and teaching productivity.

Time constraints demonstrated a weak negative relationship and were not statistically significant.

DISCUSSION

The findings of the study highlight the multidimensional nature of ICT integration in higher education. Faculty members demonstrated positive attitudes toward technology adoption and exhibited moderate to high levels of digital competence. However, infrastructural and institutional limitations continue to hinder sustainable ICT integration.

The positive influence of digital skill proficiency on innovation readiness supports previous studies emphasizing the importance of digital competence in technology adoption. Faculty members with stronger technological competence were more likely to adopt ICT innovations and maintain productive teaching practices.

The significant role of peer mentoring and resource sharing underscores the importance of collaborative learning cultures and collegial support systems in facilitating ICT integration. Faculty members who actively engaged in collaborative problem-solving and knowledge sharing demonstrated greater adaptability and resilience in addressing ICT-related challenges.

The findings also reveal that adaptive coping strategies such as self-paced online learning and simplified instructional approaches help faculty members sustain productivity despite technological limitations. These coping mechanisms reflect faculty resilience and self-directed professional growth.

Conversely, infrastructural limitations including unstable internet connectivity and insufficient technological resources negatively affected innovation readiness and teaching productivity. These findings are consistent with

studies emphasizing the continuing impact of digital inequities and resource limitations in developing educational contexts.

The strong demand for advanced professional development programs in artificial intelligence, cybersecurity, hybrid learning systems, and data analytics reflects the evolving digital competence requirements in higher education.

Overall, the findings affirm that successful ICT integration requires a holistic approach that combines infrastructure development, professional development, collaborative learning cultures, and sustainable institutional support systems.

CONCLUSION

The study concludes that faculty members at Negros Oriental State University Main Campus 1 demonstrate positive readiness and willingness to adopt ICT innovations in teaching. However, sustainable ICT integration remains constrained by infrastructural, technical, and institutional limitations. Although faculty members possess satisfactory operational digital competencies, gaps remain in advanced technological skills such as cybersecurity, artificial intelligence integration, and data analytics.

The study further concludes that ICT integration challenges including unstable internet connectivity, insufficient technological resources, inadequate technical skills, and workload-related pressures negatively influence faculty innovation readiness and teaching productivity. Despite these challenges, faculty members demonstrate resilience through adaptive coping strategies such as peer mentoring, self-paced online learning, offline teaching backups, and simplified instructional approaches.

Moreover, ICT profile variables, encountered challenges, and coping strategies significantly predict faculty innovation readiness and perceived teaching productivity. Digital skill proficiency and peer mentoring emerged as strong positive predictors, while infrastructural limitations negatively affected ICT integration outcomes.

The findings affirm that successful ICT integration requires a comprehensive and systems-based approach that integrates infrastructure enhancement, continuous faculty development, collaborative professional support systems, and sustainable institutional ICT policies.

RECOMMENDATIONS

- Strengthen institutional ICT infrastructure by ensuring stable internet connectivity, upgraded digital devices, and expanded access to technological resources.
- Institutionalize continuous professional development programs focusing on artificial intelligence, cybersecurity, data analytics, hybrid learning systems, and digital pedagogy.
- Implement faculty capacity-building initiatives that emphasize ethical and effective use of emerging technologies.
- Strengthen peer mentoring programs, faculty learning communities, and collaborative professional support systems.
- Improve technical support services and ICT troubleshooting mechanisms within the university.
- Enhance learning management systems through improved accessibility, usability, and adaptive learning features.
- Develop sustainable ICT integration frameworks aligned with long-term institutional goals.
- Promote innovation-driven teaching practices through gradual implementation of advanced technologies such as virtual reality and augmented reality.

- Conduct future longitudinal and multi-institutional studies examining the long-term effects of ICT integration on teaching productivity and educational outcomes.

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