

# Influence of Innovation and Digital Transformation on Faculty Research and Development in Private School

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## ABSTRACT

The integration of research and development into education systems has become a defining factor in institutional success and global recognition. The study investigated the role of research and development in promoting faculty innovation and digital transformation among 125 private school faculty members randomly selected from the selected private schools in one of the municipalities of Misamis Occidental during the school year 2025-2026. It utilized a descriptive correlational design. Researcher-made questionnaires were used to collect the data, which were analyzed using Mean and Standard Deviation, Pearson Product Correlation Coefficient, and Regression Analysis. Results revealed a very good level of faculty innovation, a very high level of faculty digital transformation, and a very good level of research and development in private schools. There is a significant relationship between faculty innovation, faculty digital transformation, and research and development. Research integration in teaching and data-driven decision-making were found to be predictors of faculty digital transformation.

**Keywords:** Development, Innovation, Research, Student Engagement, Teaching Practice

## INTRODUCTION

In today's knowledge-driven world, education stands at the forefront of technological and pedagogical transformation (Moravec, 2022). Research and development (R&D) have emerged as the strategic foundation for improving the quality, relevance, and competitiveness of academic institutions, particularly private schools (McCowan et al., 2022). Through R&D initiatives, schools cultivate a culture of exploration and innovation that encourages faculty to design learning experiences responsive to 21st-century demands. Faculty members who engage in research gain deeper insights into emerging educational challenges, enabling them to craft adaptive and evidence-based teaching methods (Parr, 2022). This continuous engagement in scholarly inquiry enhances not only instructional quality but also institutional performance and reputation. As a result, R&D becomes the cornerstone of educational excellence and a pathway for sustaining innovation in private higher education (Honcharuk et al., 2024).

The shift toward digital education has further emphasized the transformative role of R&D in redefining how faculty teach and students learn (Deroncele-Acosta et al., 2023). Research-driven innovation allows educators to integrate digital tools that personalize instruction, foster collaboration, and improve learner engagement (Skenderi & Skenderi, 2023). R&D also helps institutions identify effective models for implementing online learning systems, developing digital content, and managing data-driven academic operations. Faculty participation in technology-based research strengthens their ability to adapt to evolving instructional platforms while maintaining the integrity of learning outcomes (Nair et al., 2025). This synergy between research and technology nurtures a digital mindset that aligns teaching with the realities of a technology-saturated society. Consequently, digital transformation, when anchored on robust R&D, ensures that private schools remain agile and future-ready (Aithal & Aithal, 2023).

Globally, the integration of R&D into education systems has become a defining factor in institutional success and global recognition (Rasheed, 2023). Leading universities have invested heavily in interdisciplinary research,

innovation hubs, and technology incubators that connect academia with industry and society (Owuondo, 2023). These R&D ecosystems foster collaboration that transcends traditional disciplinary boundaries, promoting creativity and innovation as central elements of higher education. Faculty researchers are encouraged to transform theoretical concepts into practical applications that solve real-world problems (Kouskoura et al., 2024). Moreover, international collaboration enables knowledge exchange and accelerates innovation across regions. This global movement underscores the role of R&D not merely as an academic activity but as a powerful instrument of social progress and institutional sustainability (Shen et al., 2022).

In the Philippine context, research and development have gained prominence as essential drivers of educational reform and national development (Baylan, 2023). The Commission on Higher Education (CHED) continues to strengthen policies and programs that promote research excellence, faculty capability building, and innovation-led growth (Masatoshi, 2025). Private schools are increasingly integrating R&D in their institutional frameworks, recognizing its potential to improve instruction, promote digital literacy, and elevate academic standards (Zhao et al., 2024). Through grants, partnerships, and collaborative projects, faculty researchers contribute to addressing local and national issues while enhancing institutional competitiveness. However, resource constraints, research culture gaps, and limited infrastructure remain key challenges to the full realization of R&D's potential. Despite these barriers, Philippine private schools are steadily building momentum toward a more research-oriented and innovation-driven educational system (Reyes, 2023).

Faculty innovation serves as the link between research outcomes and educational transformation. It encompasses teachers' ability to create, experiment with, and apply new pedagogical strategies that enhance learning experiences (Timotheou et al., 2023). By engaging in R&D, faculty members become active contributors to knowledge generation and digital adaptation. They are empowered to incorporate creative teaching designs, interactive media, and technology-enhanced instruction that promote higher-order thinking and collaboration. Institutional support, including research incentives, training, and access to technology, further motivates educators to innovate (Stumbrienė et al., 2024). Ultimately, when research becomes part of faculty culture, it leads to continuous improvement in teaching practices and institutional excellence (Horta, 2022).

Digital transformation, meanwhile, signifies a paradigm shift in how education is delivered, managed, and experienced. It involves integrating digital systems that support personalized learning, data analytics, and administrative efficiency (Mhlanga, 2022). Faculty members play a crucial role in realizing this transformation by adopting technology-enhanced pedagogies, participating in online collaborations, and creating digital learning resources. R&D initiatives provide the foundation for evaluating the effectiveness of these innovations and ensuring their sustainability (Jain et al., 2025). In this regard, digital transformation is not just about adopting technology—it is about reimagining education through research-informed, human-centered design. The successful implementation of this process depends on the synergy among institutional vision, faculty competence, and a strong research culture (Wang et al., 2023).

This study is significant because it examines how research and development (R&D) drives innovation and digital transformation in private schools. By analyzing the relationship between R&D initiatives and institutional advancement, the study provides valuable insights into how schools can strengthen their capacity for creativity, technological adaptability, and continuous improvement. It highlights the strategic importance of fostering a strong research culture as a foundation for innovation and digital integration in education. Moreover, the study emphasizes the role of R&D in promoting evidence-based practices that enhance instructional quality and organizational effectiveness. Through this exploration, the research contributes to a deeper understanding of how R&D can sustain competitiveness, support institutional transformation, and ensure relevance in an increasingly technology-driven educational landscape. Ultimately, it underscores the pivotal role of R&D as a catalyst for progress and sustainability in private higher education.

## **THEORETICAL FRAMEWORK**

This study utilized the following theories: the Knowledge Creation Theory by Nonaka and Takeuchi (1995), the Diffusion of Innovations Theory by Everett Rogers (2003), and the Technology Acceptance Model (TAM) by Davis (1989).

The Knowledge Creation Theory, also known as the **SECI Model (Socialization, Externalization, Combination, and Internalization)**, explains how organizations continuously create and utilize knowledge to foster innovation (Lee, 2022). In the academic context, this theory highlights how R&D activities enable faculty and institutions to generate, share, and apply new knowledge to improve teaching, research, and institutional strategies. Faculty members act as knowledge creators, transforming tacit knowledge (experience-based) into explicit knowledge (documented research outputs). Through collaboration and dissemination, universities develop organizational learning and innovation. Thus, R&D becomes a strategic process for continuous improvement and institutional development (Asbari & Asbari, 2025).

Several recent studies have employed aspects of the **Knowledge Creation Theory** in educational settings to explore how knowledge is generated, shared, and converted for innovation (Oliveira et al., 2024). The Development of Mathematics Teaching Models in Thailand used a SECI-inspired design to structure instruction so that students build mathematical competence through tacit-to-explicit knowledge conversion (Bouncken et al., 2023). Another study compared bachelor's and master's degree students and found that dimensions such as "combination" and "socialization" (elements of SECI) correlated strongly with creativity across different student groups (Fuad et al., 2022). A third study explored knowledge sharing among Master Teachers in Mindanao, examining how individual innovativeness and knowledge sharing influence professional competence (De Bem Machado et al., 2022). Additionally, research conducted in Japan investigated how students engage in creating knowledge through blended learning using technology-supported collaboration, reflection, and planning, which reflect externalization, combination, and internalization processes (Pierson, 2022). A few studies also used knowledge management (with overlaps with knowledge creation) to examine how educational institutions innovate management practices (Liu et al., 2025).

In this study, the Knowledge Creation Theory (Nonaka & Takeuchi, 1995) provides a strong foundation for understanding how private schools can leverage research and development (R&D) to foster faculty innovation and enable digital transformation. Its SECI model (socialization, externalization, combination, internalization) describes how tacit knowledge (skills and insights held by faculty) is converted into explicit knowledge (shared theories and documented practices), which is essential for developing innovative teaching methods and digital competencies. Within the R&D processes of private schools, socialization (e.g., mentoring, collaborative research) allows faculty to share and build upon their tacit understandings of pedagogy. Externalization and combination help translate those tacit insights into structured digital tools, curricula, or new business models. Internalization ensures that faculty embed and apply these innovations in daily teaching and institutional practices, thus sustaining transformation. Thus, Knowledge Creation Theory links directly to both how R&D can promote faculty innovation and how it underpins the adoption and effective use of digital technologies in academic settings.

The Diffusion of Innovations Theory explains how new ideas, technologies, and practices spread within a social system (Mbatha, 2024). In the academic setting, this theory describes how faculty members adopt and implement innovative teaching strategies, research approaches, and pedagogical tools (Çakıroğlu et al., 2022). The rate of innovation adoption depends on factors such as perceived benefits, institutional culture, communication channels, and faculty readiness. Early adopters of innovation influence others, driving a collective transformation in teaching and learning practices. Therefore, this theory provides a solid foundation for analyzing how R&D initiatives promote faculty innovation and foster a culture of creativity within private schools (Anthony Jr et al., 2022).

Recent studies have increasingly utilized the **Diffusion of Innovations Theory** to examine technology adoption and change processes in educational institutions. A global study on generative AI in higher education analyzed how universities adopt artificial intelligence by emphasizing Rogers' innovation attributes: compatibility, trialability, and observability, as determinants of institutional acceptance (Gutiérrez-Leefmans, 2025). Similarly, research on generative ai adoption in the classroom integrated both the Technology Acceptance Model (TAM) and Diffusion of Innovations Theory to understand teachers' perceptions of usefulness and ease of use in adopting new AI tools (Ghimire & Edwards, 2024). Another study also employed Rogers' five-stage innovation process to trace the transition of blended learning from experimentation to institutional routinization (Ali & Georgiou, 2024). In the U.S., a case study explored how early adopters influenced peers' acceptance of a learning

management system through demonstration and support (Amador, 2025). Furthermore, this study applied Rogers' framework to explain how faculty gradually adopt and sustain innovative teaching approaches. Finally, a study in Kuwait confirmed that teachers' perceptions of relative advantage, compatibility, and observability strongly affect their willingness to integrate educational technologies, underscoring the continuing relevance of Diffusion of Innovations Theory in education (Al Breiki, 2023).

The **Diffusion of Innovations Theory** (Rogers, 2003) is highly relevant to this study as it explains how new ideas, technologies, and practices spread within an organization, aligning with how research and development (R&D) initiatives introduce and encourage innovative teaching methods among faculty members. Through the stages of knowledge, persuasion, decision, implementation, and confirmation, the theory provides a framework for understanding how faculty adopt innovations and digital tools resulting from R&D efforts. It also highlights the role of opinion leaders and early adopters in influencing others to embrace technological and pedagogical advancements. By examining factors such as relative advantage, compatibility, and complexity, the study can assess what motivates or hinders faculty participation in innovation and digital transformation. Thus, Diffusion of Innovations Theory serves as a guiding lens for analyzing how R&D drives the successful adoption and institutionalization of innovative and digital practices in private schools.

The Technology Acceptance Model (TAM) by Davis (1989) explains how individuals come to accept and use technology based on two main factors: **perceived usefulness** and **perceived ease of use** (Ibrahim & Shiring, 2022). In higher education, TAM helps explain how faculty members embrace digital transformation by integrating technology into teaching, research, and administrative functions (Osman & Yatam, 2024). When educators perceive technology as beneficial and user-friendly, they are more likely to adopt it effectively. Institutional support, training, and R&D initiatives further strengthen this acceptance. Thus, TAM aligns perfectly with the study's goal of understanding how R&D drives digital transformation among private school faculty (Aurangzeb et al., 2024).

Recent studies have consistently applied the Technology Acceptance Model to examine educators' and students' willingness to adopt digital tools in learning environments (Aurangzeb et al, 2024). For instance, a study in Cebu, Philippines, used TAM to assess perceptions of usefulness, ease of use, attitude, and intention to use Moodle, finding significantly positive acceptance across all TAM dimensions (Petancio et al., 2024). A study in Thailand extended TAM by including constructs such as self-efficacy, subjective norms, and facilitating conditions; it found that teacher attitudes and perceived usefulness strongly predicted behavioral intention (Nuamsamrarn & Achwarin, 2023). In a Malaysian pilot study, researchers found perceived usefulness, ease of use, and credibility strongly correlated with intention to use among higher education teachers (Tan et al., 2024). Another study in South Africa examined how perceived usefulness, perceived ease of use, system quality, information quality, and service quality affect learners' engagement and performance when using blockchain and AI in e-learning; results confirmed the TAM variables' significant positive effects (Naidoo, 2023). Finally, a study in the Philippines found that perceived usefulness and ease of use are strong predictors of intention to use an LMS, which, in turn, influences satisfaction (Oluyinka & Cusipag, 2024).

The Technology Acceptance Model (TAM) is highly relevant to this study since this model explains how users come to accept and use new technologies, emphasizing two key determinants, perceived usefulness and perceived ease of use, which directly influence behavioral intention and actual adoption. In the context of private schools, TAM provides a framework for understanding how faculty members perceive and adopt innovations and digital tools introduced through research and development initiatives. It helps identify whether R&D outputs, such as digital platforms or instructional technologies, are effectively designed to meet faculty needs and enhance teaching efficiency. By applying TAM, the study can assess how faculty attitudes and experiences shape their willingness to integrate digital innovations into pedagogical practices. Thus, the model bridges the link between R&D-driven technological innovations and faculty acceptance, ultimately contributing to sustainable digital transformation in education.

## Conceptual Framework

This study comprises two independent variables and one dependent variable. The first independent variable is

faculty innovation, with creative pedagogy, research integration in teaching, problem-solving initiative, and continuous professional development as its constructs. The second independent variable is faculty digital transformation, with its constructs: digital competence, technology integration in teaching, data-driven decision-making, and adoption of business models. The dependent variable is research and development (R&D), where the constructs are research capability, institutional support, collaborative engagement, and knowledge dissemination.

**Innovation** is a key element in strengthening the culture of research and development among private school educators (Fuad et al., 2022). It reflects teachers' ability to create, adapt, and apply new ideas and methods that enhance learning and organizational performance. Through innovative practices, faculty members contribute not only to classroom improvement but also to the broader goals of institutional research and transformation (Skrbinjek et al., 2024). By embracing creativity, inquiry, and continuous improvement, educators can align their work with the school's mission of providing quality education supported by R&D. Ultimately, faculty innovation bridges the gap between traditional teaching and modern educational demands driven by evidence-based, research-oriented approaches (Sawant et al., 2023).

Creative pedagogy refers to the teacher's capacity to design and implement instructional strategies that inspire imagination, curiosity, and active learning among students (Revenko et al., 2024). It involves using diverse and engaging teaching methods such as project-based learning, interdisciplinary instruction, and experiential activities. Through creative teaching, faculty members make learning more relevant and meaningful, which, in turn, encourages students to think critically and solve problems innovatively (Saroyan, 2022). This construct emphasizes flexibility and the courage to experiment with new techniques that depart from rigid, routine instruction. As a result, creative pedagogy provides a powerful foundation for research and development, generating new insights into effective educational practices (Jarilkapovich, 2024).

Research integration in teaching pertains to the intentional use of research findings and methodologies in classroom instruction (Mahmoud, 2023). Faculty members who integrate research demonstrate how theory and evidence inform educational practice, thus enhancing students' understanding of real-world applications. This process not only enriches learning but also promotes a culture of inquiry among both teachers and students (Sliwka et al., 2024). It encourages educators to continuously assess and refine their approaches based on data, feedback, and scholarly work. Consequently, research integration strengthens the link between innovation and R&D by making the classroom a site of ongoing knowledge generation and experimentation (Anwar et al., 2022).

Problem-solving initiative is the proactive ability of faculty members to identify institutional or instructional challenges and address them with creative, research-based solutions (Randles et al., 2022). Teachers who demonstrate this trait exhibit resilience, analytical thinking, and a drive to improve their professional environment. It involves diagnosing issues such as learning gaps, curriculum inefficiencies, or barriers to student engagement, then designing innovative interventions (Durnali & Gökbulut, 2025). By applying systematic inquiry and experimentation, educators contribute to the organization's R&D efforts and overall improvement. This construct reinforces the importance of innovation as a dynamic process that transforms problems into opportunities for growth and development (Culduz, 2024).

Continuous professional development refers to sustained efforts by faculty members to enhance their knowledge, skills, and competencies through training, research, and reflective practice (Bendtsen et al., 2022). It underscores the idea that innovation is a lifelong process that thrives on constant learning and adaptation. Through workshops, graduate studies, seminars, and participation in research projects, teachers stay abreast of emerging trends and technologies (Aris et al., 2022). Such commitment enhances teaching effectiveness and aligns personal growth with institutional advancement. Therefore, continuous professional development strengthens the foundation of faculty innovation by ensuring that educators remain competent, inspired, and research-driven contributors to educational excellence (Solomon et al., 2023).

**Faculty digital transformation** involves a comprehensive shift from traditional teaching methods to technology-enabled, research-informed, and data-driven practices (Fobert, 2024). It embodies the process through which teachers integrate digital tools, online resources, and innovative platforms to enhance both

teaching and institutional operations. This transformation empowers faculty members to become more adaptive, collaborative, and analytical in responding to the changing demands of education in the digital era (Maki & Shea, 2023). It also facilitates stronger alignment between teaching and research, as technology provides new ways to collect data, evaluate outcomes, and disseminate findings. Ultimately, faculty digital transformation catalyzes research and development, ensuring that schools remain relevant, resilient, and forward-looking in a knowledge-driven society (Atobishi et al.,

Digital competence refers to faculty members' ability to effectively use digital technologies for teaching, research, and professional tasks (Basilotta-Gómez-Pablos et al., 2022). It involves technical proficiency, critical understanding of digital ethics, and creative application of technological tools. Educators with strong digital competence can navigate learning management systems, virtual classrooms, and data analytics platforms with confidence and precision (Heine et al., 2023). This construct also reflects a teacher's readiness to explore emerging technologies that can improve learning experiences and streamline research processes. By enhancing digital competence, private school faculty contribute to a more innovative and research-engaged academic community (Basantes-Andrade et al., 2022).

Technology integration in teaching pertains to the strategic use of digital tools, applications, and online resources to enhance instructional delivery and student engagement (Sabri et al., 2024). It is not merely about using gadgets, but about transforming pedagogy through meaningful digital experiences. Faculty members who effectively integrate technology design lessons that promote interactivity, collaboration, and independent inquiry among learners (Thelma et al., 2024). This approach allows educators to collect and analyze learning data that informs instructional improvement and research innovation. In essence, technology integration bridges the gap between digital transformation and R&D by fostering a culture of experimentation and evidence-based teaching (Jong et al., 2022).

Data-driven decision-making highlights the faculty's ability to utilize digital information and analytics to guide teaching, assessment, and program development (Gonugunta & Leo, 2024). This construct emphasizes the role of data as a foundation for making informed and objective educational decisions. Teachers who adopt this approach use student performance analytics, survey results, and digital feedback tools to evaluate learning outcomes and refine instructional strategies (Kayumova et al., 2024). The practice encourages systematic inquiry, thereby aligning teaching actions with measurable evidence and research outcomes. By promoting transparency and accountability, data-driven decision-making enhances both innovation and R&D productivity in private schools (Mpofu & Chasokela, 2025).

**Research and Development (R&D)** serves as the core mechanism that integrates faculty innovation and digital transformation into a cohesive framework for institutional growth (Yordanova, 2024). It embodies the systematic pursuit of new knowledge, the creation of solutions, and the dissemination of findings that advance educational practice and policy. In private schools, R&D nurtures a culture of inquiry and collaboration, empowering faculty members to explore, experiment, and evaluate new teaching methods and technologies (Rossoni et al., 2024). Through R&D, educators become active contributors to institutional improvement rather than passive implementers of policy. Ultimately, a robust R&D environment strengthens academic excellence, fosters creativity, and ensures the sustainability of innovative and digital initiatives within the institution (Xu et al., 2023).

Research capability refers to the faculty's competence in conceptualizing, conducting, and disseminating studies that address educational and organizational challenges (Perez et al., 2022). It involves mastery of research design, data analysis, and ethical scholarly practices that ensure credibility and relevance. Faculty members with strong research capabilities contribute to generating new knowledge that supports evidence-based decision-making and teaching innovation (Whitton et al., 2022). This construct also reflects an educator's confidence in transforming classroom experiences into research opportunities that advance institutional goals. By enhancing research capability, private schools create a workforce of teacher-scholars who drive innovation and digital transformation through rigorous inquiry (Villarino, 2022).

Institutional support encompasses the structures, resources, and policies schools provide to sustain faculty engagement in research and development (Li & Xu, L., 2024). It includes financial grants, mentoring programs, administrative assistance, and recognition systems that motivate educators to pursue scholarly work. When institutions actively support research, they cultivate a sense of value and belonging among faculty, reinforcing their commitment to innovation and digital progress (Taylor & Colet, 2023). This construct highlights that R&D thrives not solely on individual effort but on collective organizational commitment. Therefore, institutional support acts as the backbone of a research culture that aligns faculty creativity and digital initiatives with long-term academic advancement (Fitzgerald et al., 2023).

Collaborative engagement involves the partnership and cooperation among faculty, students, administrators, and external stakeholders in conducting research and implementing innovative projects (Grunwald et al., 2024). It underscores the importance of teamwork and shared expertise in solving complex educational problems. Through collaboration, teachers gain exposure to diverse perspectives, interdisciplinary approaches, and shared resources that enrich research outcomes (Srinivas & Varaprasad, 2023). This construct promotes open communication and mutual learning, strengthening the school's network for innovation and knowledge creation. As a result, collaborative engagement transforms research and development into a dynamic, community-based process that reinforces institutional relevance and social impact (Zitha et al., 2023).

Knowledge dissemination refers to the process of sharing research findings, innovations, and best practices within and beyond the institution (Grant & Phene, 2022). It involves publications, conferences, workshops, and digital platforms that make scholarly outputs accessible and actionable. Faculty members who engage in dissemination help bridge the gap between theory and practice, ensuring that innovations contribute to actual educational improvement (Idrees et al., 2023). This construct emphasizes the importance of visibility and utilization of research outcomes in shaping institutional policies and classroom strategies. By prioritizing knowledge dissemination, private schools create a feedback loop that sustains R&D growth, promotes accountability, and inspires continuous learning across the academic community (Adhikari & Shrestha, 2023).

Faculty innovation and digital transformation are mutually reinforcing forces that drive the growth and sustainability of research and development (R&D) in private schools. Innovative faculty members who practice creative pedagogy, integrate research in teaching, and continuously develop their professional skills create a fertile ground for inquiry and discovery. Simultaneously, digital transformation strengthens this process by providing the tools, data, and technological competence necessary to implement, measure, and enhance innovative practices.

When these two independent variables work in synergy, they empower educators to conduct relevant research, collaborate effectively, and disseminate knowledge that advances institutional goals. Thus, R&D emerges as the outcome of innovation and digital transformation—serving as both the product and the enabler of a progressive, research-oriented, and future-ready educational institution.

## Design

This study utilized a descriptive–correlational design. A descriptive–correlational design seeks to describe variables as they naturally occur and to examine the possible relationships between them without manipulating conditions (Creswell & Creswell, 2018). It is particularly useful when researchers aim to measure the strength and direction of associations between leadership behaviors, organizational culture, and decision-making practices.

The descriptive–correlational research design is appropriate for this study because it enables the researcher to determine how research and development (R&D) initiatives relate to innovation and digital transformation among private school faculty. Instead of establishing causation, this design focuses on identifying the strength and direction of relationships between R&D practices and faculty engagement in technological and pedagogical innovation.

It allows the study to examine how R&D activities, such as training, project implementation, and institutional support, contribute to faculty's ability to adopt and integrate digital tools into teaching and learning. Moreover, this approach provides a broader understanding of how institutional R&D efforts foster a culture of innovation and continuous improvement. In educational settings, where innovation and digital transformation are critical to competitiveness and quality, the descriptive–correlational design offers valuable insights into how R&D initiatives shape faculty behavior and institutional progress (Lu & Wang, 2023).

### Setting

This study was conducted in the selected private schools in one of the municipalities of Misamis Occidental. Misamis Occidental has a strong economic and institutional base, with government institutions, educational institutions, health centers, and enterprises. The teaching force of these private schools has recognized the vital role of research and development in advancing innovation and digital transformation.

### Respondents

The respondents of this study were the 125 private school faculty members who assessed the implementation of innovation and digital transformation in relation to research and development (R&D) within their institutions.

To ensure fair representation, participants will be selected through stratified random sampling across various academic departments and grade levels. This approach ensures that perspectives from different disciplines and teaching contexts are adequately captured in the study. The inclusion criteria were as follows: (1) full-time faculty members who have been employed in the institution for at least one (1) year; (2) have utilized or integrated innovative and digital teaching practices as part of their instructional responsibilities; and (3) willing to take part voluntarily and provide informed consent.

### Instruments

The following are the researcher-made survey questionnaires that were utilized in this study:

**The Innovation Questionnaire.** This researcher-developed questionnaire is designed to assess faculty members' innovative practices in private academic institutions. It focuses on creative pedagogy, the integration of research into teaching, problem-solving initiatives, and continuous professional development. The questionnaire uses a 4-point Likert scale with 20 statements. To determine the test's reliability and validity, it was pilot-tested with respondents who were not included in the study. The data was subjected to Cronbach's Alpha. In analyzing the data, the following scale will be used:

Responses	Continuum	Interpretation
4 – Strongly Agree	3.20–4.00	Very Good
3 – Agree	2.60–3.19	Good
2 – Strongly Disagree	1.80–2.59	Poor
1 – Disagree	1.00–1.79	Very Poor

**The Digital Transformation Questionnaire:** This researcher-designed questionnaire assesses digital transformation among faculty in private academic institutions. It focuses on digital competence, technology integration in teaching, data-driven decision-making, and the adoption of new business models. A four-point Likert scale will be used in the questionnaire, which is composed of 20 statements. To determine the test's reliability and validity, it was pilot-tested with respondents who were not included in the study. The data was subjected to Cronbach's Alpha. In analyzing the data, the following scale will be used:

Responses	Continuum	Interpretation
4 – Strongly Agree	3.20–4.00	Very High
3 – Agree	2.60–3.19	High
2 – Strongly Disagree	1.80–2.59	Low
1 – Disagree	1.00–1.79	Very Low

**The Research and Development Questionnaire:** This researcher-made instrument is designed to assess the faculty research and development in private academic institutions. It focuses on research capability, institutional support, collaborative engagement, and knowledge dissemination. A four-point Likert scale will be used in the questionnaire, which consists of 20 statements. To determine the test's reliability and validity, it was pilot-tested with respondents who were not included in the study. The data was subjected to Cronbach's Alpha. In analyzing the data, the following scale will be used:

Responses	Continuum	Interpretation
4 – Strongly Agree	3.20 – 4.00	Very High
3 – Agree	2.60 – 3.19	High
2 – Strongly Disagree	1.80 – 2.59	Low
1 – Disagree	1.00 – 1.79	Very Low

### Data Gathering Procedure

The researcher obtained prior approval from the Dean of the Graduate School of Misamis University to conduct the study. Permissions were requested from the Heads of the two private institutions where the study will be conducted. Upon gaining their approval, the researcher herself distributed the questionnaires, and the completed questionnaires were retrieved on a scheduled date. The data were collated, tabulated, and interpreted.

### Ethical Consideration

During this study, the researcher ensured clear communication with the participants. Approval was sought from the Misamis University Ethics Committee to conduct the study. Ensuring participants were well-informed and participated willingly was a priority. The study was conducted with the utmost consideration for the environment, community residents, and the participants' well-being. The researcher prioritized the security and confidentiality of the gathered data, ensuring their reasonable, credible, and valid use in the research. Efforts were made to maintain relationships with the respondents for study updates.

Respect for participants' dignity was a fundamental priority throughout the study. Additionally, the study strictly avoided dishonesty or exaggeration regarding its aims and objectives. All relationships, funding sources, and conflicts of interest were disclosed and reported. Research-related communication was conducted honestly and transparently, avoiding any misleading information or misrepresenting key data findings. Maintaining ethical standards in research is crucial to protecting participants' rights, upholding credibility, and ensuring the validity of the study's findings. Transparency, honesty, and ethical conduct are integral to responsible research practices.

## Data Analysis

The following statistical tools were used in this study:

Mean and Standard Deviation. These tools were used to describe and summarize responses on innovation, digital transformation, organizational culture for research and development, and strategic decision-making.

Pearson's  $r$  correlation coefficient was applied to test whether a significant relationship exists between innovation, digital transformation, and research and development.

Regression Analysis was applied to identify which aspects of innovation and digital transformation serve as predictors of research and development. It allowed the researcher to assess the extent of influence these variables exert on the research and development among private school faculty.

## RESULTS AND DISCUSSIONS

### Level of Faculty Innovation

The results in Table 1 revealed that the overall level of faculty innovation ( $M = 3.63$ ,  $SD = 0.61$ ) is interpreted as Very Good, indicating that faculty members in private schools demonstrate a strong inclination toward innovative practices. Among the constructs, problem-solving initiative ( $M = 3.68$ ,  $SD = 0.67$ ) and continuous professional development ( $M = 3.68$ ,  $SD = 0.85$ ) obtained the highest mean scores. This suggests that faculty members are highly proactive in addressing instructional challenges and are actively engaged in upgrading their competencies. The relatively higher standard deviation for professional development implies variability in engagement levels, indicating that while many faculty members actively pursue growth, others may still require institutional support to fully participate.

Regarding creative pedagogy ( $M = 3.66$ ,  $SD = 0.44$ ), the findings indicate that faculty are effectively adopting innovative teaching strategies, including interactive, student-centered, and technology-integrated approaches. This reflects a shift from traditional teaching methods to more dynamic and flexible instructional designs. Meanwhile, research integration in teaching ( $M = 3.48$ ,  $SD = 0.47$ ), although still rated Very Good, recorded the lowest mean among the constructs. This suggests that while faculty members incorporate research into instruction, it is less emphasized than other innovation practices. Overall, the results imply that innovation is well-established among faculty, particularly in applied teaching and professional growth, but further strengthening is needed in linking research outputs directly to classroom practices.

Recent studies affirm that digital transformation and innovation significantly enhance faculty teaching practices and professional capabilities (Mondragon-Estrada et al, 2023). Digital technologies have reshaped pedagogy by enabling flexible, interactive, and student-centered learning environments, which align with the high ratings in creative pedagogy and problem-solving initiative observed in this study. Research indicates that digital transformation accelerates teaching innovation, requiring educators to adapt new instructional strategies and technological competencies to remain effective in modern classrooms (Norman et al., 2025). Furthermore, innovation in higher education has been linked to improved teaching effectiveness and responsiveness to complex educational challenges, reinforcing faculty capacity for problem-solving and adaptive instruction. Empirical evidence also shows that digital transformation positively predicts faculty performance, particularly when supported by digital self-efficacy and appropriate technology integration (Tawil et al., 2026).

In addition, faculty professional development has been identified as a critical factor in sustaining innovation and research productivity in higher education institutions (Edu, 2025). Studies emphasize that continuous professional development enhances digital competence, research capability, and teaching innovation, which supports the strong results found in this construct (Ocampo et al., 2022). Digital transformation initiatives further encourage faculty to integrate research into teaching by promoting data-driven instruction and knowledge sharing, although challenges remain in fully embedding research into pedagogical practices. Moreover, post-pandemic educational reforms have intensified the need for ongoing faculty training, particularly in the use of

digital tools and innovative teaching models, highlighting the importance of sustained institutional support (Malami & Onen, 2023). Collectively, these studies confirm that innovation and digital transformation are key drivers of faculty development, teaching quality, and research engagement.

The findings imply that private schools should continue strengthening institutional policies and support systems that foster faculty innovation, particularly in enhancing research integration within teaching. While faculty demonstrate strong innovation in pedagogy and professional development, targeted interventions, such as research mentoring programs, collaborative research-teaching models, and technology-enhanced research dissemination, can further strengthen this area. Additionally, institutions should address disparities in participation in professional development by providing equitable access to training, incentives, and digital resources. Sustaining a culture of innovation will require aligning digital transformation initiatives with faculty development programs, ensuring that innovation is not only practiced but also institutionalized across teaching, research, and professional growth domains.

### **Level of Faculty Digital Transformation**

The findings in Table 2 indicated that the overall level of faculty digital transformation ( $M = 3.52$ ,  $SD = 0.49$ ) is interpreted as Very High, suggesting that faculty members in private schools are highly engaged in adopting and utilizing digital technologies in their academic roles. Among the constructs, technology integration in teaching ( $M = 3.56$ ,  $SD = 0.43$ ) and adoption of new business models ( $M = 3.56$ ,  $SD = 0.43$ ) obtained the highest mean scores. This reflects that faculty are not only effectively embedding digital tools into instructional delivery but are also adapting to emerging institutional and educational models such as flexible learning systems, online platforms, and blended modalities. The relatively low standard deviations in these constructs indicate consistency among respondents, implying a shared institutional direction toward digital transformation.

Meanwhile, data-driven decision-making ( $M = 3.50$ ,  $SD = 0.65$ ) also garnered a Very High rating, indicating that faculty members are increasingly utilizing data analytics, student performance metrics, and digital feedback systems to inform teaching and academic decisions. However, the higher standard deviation suggests variability in the extent to which these practices are applied, possibly due to differences in access to tools or training. Digital competence ( $M = 3.46$ ,  $SD = 0.43$ ), while still Very High, recorded the lowest mean among the constructs, suggesting that although faculty possess strong digital skills, there is still room for improvement, particularly in advanced or specialized digital applications. Overall, the results demonstrate that digital transformation is well-embedded in faculty practices, with strong emphasis on teaching integration and institutional adaptability, but with opportunities to further strengthen digital proficiency and consistent data utilization.

Recent literature underscores the critical role of digital transformation in enhancing faculty effectiveness, teaching innovation, and institutional competitiveness. Digital competence has been widely recognized as a foundational element of successful digital transformation, enabling educators to effectively integrate technology into pedagogy and adapt to evolving educational environments (Palacios-Rodríguez et al., 2023). Studies show that faculty with higher levels of digital competence are more likely to implement innovative teaching strategies and achieve improved student outcomes (Oliveira & De Souza, 2022). Furthermore, technology integration in teaching has been strongly linked to increased student engagement, flexible learning opportunities, and improved instructional delivery, particularly in blended and online learning contexts (Timotheou et al., 2023). In addition, the use of data-driven decision-making and the adoption of new educational models are increasingly shaping modern higher education systems. Research highlights that data analytics enables faculty to make informed instructional decisions, personalize learning experiences, and improve academic performance (Joseph et al., 2024). Similarly, digital transformation has facilitated the emergence of new business models in education, such as digital platforms, micro-credentialing, and hybrid learning ecosystems, which require faculty to adapt their roles and competencies (Alenezi et al., 2023). These developments reinforce the findings of the present study, emphasizing that digital transformation is not only technological but also pedagogical and organizational in nature, requiring continuous adaptation and innovation from faculty members.

The results implied that private schools should sustain and further institutionalize digital transformation initiatives by strengthening faculty digital competence and ensuring consistent application of data-driven

practices. While faculty already demonstrate very high levels of technology integration and adaptability to new educational models, targeted capacity-building programs focusing on advanced digital skills, learning analytics, and emerging technologies can enhance overall effectiveness. Additionally, institutions should invest in robust digital infrastructure and analytics systems to support evidence-based decision-making across all faculty members. Embedding digital transformation into strategic planning, curriculum design, and professional development programs will ensure long-term sustainability and alignment with evolving educational demands.

### **Level of Faculty Research and Development**

The findings in Table 3 indicate that the overall level of faculty research and development ( $M = 3.39$ ,  $SD = 0.55$ ) is rated Very Good, indicating that faculty members demonstrate strong engagement in research-related activities and professional scholarly growth. Among the constructs, collaborative engagement ( $M = 3.45$ ,  $SD = 0.73$ ) obtained the highest mean score, suggesting that faculty actively participate in research partnerships, interdisciplinary collaborations, and academic networks. This reflects a positive research culture that values knowledge exchange and teamwork. However, the relatively higher standard deviation implies variability in collaboration opportunities or participation levels across faculty members.

Both research capability ( $M = 3.40$ ,  $SD = 0.73$ ) and institutional support ( $M = 3.40$ ,  $SD = 0.83$ ) were rated Very Good, indicating that faculty possess adequate research skills and perceive institutional mechanisms such as funding, training, and administrative support as generally sufficient. Nevertheless, the higher variability in institutional support suggests that all faculty may not uniformly experience access to resources or support systems. Meanwhile, knowledge dissemination ( $M = 3.39$ ,  $SD = 0.55$ ) recorded the lowest mean. However, it remains within the Very Good range, suggesting that while faculty engage in publishing and sharing research outputs, this aspect may require further strengthening. Overall, the results indicate a solid foundation in research and development, with particular strengths in collaboration, but highlight the need for more consistent institutional support and enhanced dissemination practices.

Recent studies emphasize that faculty research capability and institutional support are critical determinants of research productivity and academic development. Research capability, which includes skills in research design, data analysis, and scholarly writing, has been found to significantly influence the quality and quantity of research outputs (Owan et al., 2024). At the same time, institutional support such as access to funding, mentoring, research infrastructure, and administrative assistance plays a vital role in enabling faculty to sustain research engagement (Bhatti et al., 2022). Studies further indicate that higher education institutions that prioritize research development through structured programs and incentives tend to produce more impactful and consistent scholarly outputs, reinforcing the importance of supportive organizational environments (Abbasi et al., 2025).

Moreover, collaborative engagement and knowledge dissemination are increasingly recognized as essential components of modern research ecosystems. Collaboration enhances research quality by integrating diverse perspectives, sharing expertise, and increasing publication impact (Arsalan et al., 2024). In parallel, effective dissemination of knowledge through publications, conferences, and digital platforms ensures that research findings contribute to academic discourse and societal development (Ruiz-Rojas et al., 2024). However, challenges such as limited access to high-impact journals, time constraints, and insufficient institutional incentives can hinder dissemination efforts. These studies support the present findings, highlighting that while faculty may be actively engaged in research and collaboration, strengthening dissemination strategies and institutional support systems is essential for maximizing research impact.

The findings implied that private schools should enhance and equalize institutional support systems to sustain and further improve faculty research and development. While faculty demonstrate strong research capability and collaborative engagement, institutions need to invest more in structured research mentoring, funding opportunities, and accessible research infrastructure to address variability in support. Additionally, strengthening knowledge dissemination by incentivizing publication, conference participation, and the use of digital research platforms can increase the visibility and impact of faculty outputs. Establishing a comprehensive research

development framework that integrates capability-building, collaboration, and dissemination will ensure a more robust and sustainable research culture aligned with institutional and national academic goals.

### **Significant Relationship Between the Faculty Innovation and Research and development**

Table 4 presents the significant relationships between faculty innovation and research and development variables. All computed values are positive and statistically significant ( $p < 0.001$ ), leading to the rejection of the null hypothesis across all pairings. This indicates that higher levels of faculty innovation are consistently associated with greater research capability, greater utilization of institutional support, greater collaborative engagement, and greater knowledge dissemination.

Among the innovation constructs, continuous professional development (CPD) shows the strongest and most consistent relationships with all research and development variables, particularly with research capability ( $r_s = 0.621$ ), collaborative engagement ( $r_s = 0.613$ ), and knowledge dissemination ( $r_s = 0.612$ ). These coefficients suggest a moderate to strong positive correlation, indicating that faculty who actively engage in continuous learning and professional growth are more likely to enhance their research competencies, collaborate effectively, and disseminate knowledge. Similarly, research integration in teaching shows strong correlations, especially with knowledge dissemination ( $r_s = 0.634$ ) and research capability ( $r_s = 0.593$ ), suggesting that integrating research into teaching practices strengthens both the production and dissemination of scholarly outputs.

On the other hand, creative pedagogy and problem-solving initiative exhibit moderate positive correlations with research and development variables. For instance, Creative Pedagogy has its strongest link with knowledge dissemination ( $r_s = 0.456$ ), suggesting that innovative teaching strategies may encourage faculty to share knowledge and research outputs more actively. Meanwhile, problem-solving initiative shows its highest correlation with knowledge dissemination ( $r_s = 0.525$ ) and institutional support ( $r_s = 0.479$ ), indicating that faculty who are proactive in addressing challenges are more likely to leverage institutional resources and contribute to scholarly communication. Overall, the results highlight that all dimensions of faculty innovation significantly contribute to strengthening research and development, with CPD and research integration emerging as the most influential drivers.

Recent studies affirm the strong linkage between faculty innovation and research productivity, particularly in the context of continuous professional development and research-integrated teaching (Sharplin et al., 2025). Continuous professional development has been identified as a key driver of research capability, as it enhances faculty skills in research methodologies, academic writing, and knowledge production (Badawy et al., 2025). Furthermore, integrating research into teaching fosters a scholarly approach to instruction, enabling faculty to generate new knowledge while simultaneously improving student learning outcomes (Lu & Zhang, 2025). Empirical evidence suggests that faculty who actively engage in professional learning and research-informed teaching practices tend to exhibit higher levels of research output and dissemination.

In addition, innovation-related competencies such as creative pedagogy and problem-solving have been linked to enhanced collaboration and knowledge sharing in academic environments (Luo et al., 2025). Studies show that innovative teaching practices encourage interdisciplinary collaboration and the exchange of ideas, which in turn strengthen research engagement and publication productivity (Isabirye & Moloi, 2025). Problem-solving initiatives, particularly in dynamic, technology-driven environments, enable faculty to navigate research challenges and effectively utilize institutional support systems (Onen, 2025). Moreover, knowledge dissemination is significantly influenced by faculty innovation, as innovative educators are more likely to adopt digital platforms and collaborative networks for sharing research outputs (Gilmour, 2024). These findings support the present study, confirming that innovation is a critical enabler of research and development in higher education.

From the perspective of Knowledge Creation Theory, the significant positive relationships indicate that faculty innovation facilitates continuous knowledge conversion processes within academic institutions (Zhang et al., 2023). Continuous professional development (CPD) enhances tacit knowledge through learning experiences, which is then externalized into explicit research outputs such as publications and instructional materials. The

strong correlations between research integration in teaching and knowledge dissemination reflect the socialization and combination phases, where knowledge is shared, refined, and expanded collaboratively (Ibarra-Cisneros et al., 2023). Moreover, creative pedagogy and problem-solving initiative contribute to internalization, allowing faculty to apply newly created knowledge in practice, thereby strengthening research capability (Yu et al., 2026). Overall, the findings affirm that dynamic knowledge-creation processes are sustained by innovative faculty behaviors, thereby leading to improved research productivity and collaboration.

Similarly, Diffusion of Innovations Theory explains how innovative practices among faculty spread and influence research and development variables across the institution (Menzli et al., 2022). The strong influence of continuous professional development suggests that faculty who adopt new knowledge and skills early become change agents who model effective research practices for others (Smith & Gillespie, 2023). Research integration in teaching acts as a communication channel through which innovations are embedded in routine academic activities, accelerating their diffusion. The moderate yet significant relationships between creative pedagogy and problem-solving initiative indicate that even incremental innovations can spread and positively impact collaboration and the utilization of institutional support (Zhang et al., 2023). Furthermore, the consistent association with knowledge dissemination highlights how innovative behaviors enhance the visibility and adoption of scholarly outputs within and beyond the institution (Hamzah et al., 2024). Thus, the results demonstrate that the diffusion of innovative practices among faculty is a critical mechanism for strengthening overall research capacity and engagement.

The findings implied that private schools should prioritize innovation-driven faculty development strategies to enhance research and development outcomes. Specifically, strengthening continuous professional development programs and promoting the integration of research into teaching can significantly improve faculty research capacity, collaboration, and knowledge dissemination. Institutions should also foster a supportive environment that encourages innovative teaching and problem-solving, as these contribute to the effective use of institutional resources and to research productivity. Establishing structured programs that align innovation with research goals, such as research-based teaching initiatives, interdisciplinary collaboration platforms, and professional learning communities, can further institutionalize the positive relationship between faculty innovation and research development.

### **Significant Relationship Between Faculty Digital Transformation and Research and development**

Table 5 presents the relationships between faculty digital transformation and research and development variables. All coefficients are positive and statistically significant at  $p < 0.001$ , indicating strong evidence to reject the null hypothesis across all variable pairings. This confirms that higher levels of digital transformation among faculty are associated with stronger research capabilities, greater utilization of institutional support, greater collaborative engagement, and greater knowledge dissemination.

Among the constructs, digital competence demonstrates the strongest relationship with research capability ( $r_s = 0.689$ ), indicating a strong positive correlation. This suggests that faculty with higher levels of digital skills are better able to conduct research, particularly in areas such as data analysis, digital research tools, and online academic resources. It also shows moderate relationships with knowledge dissemination ( $r_s = 0.534$ ) and collaborative engagement ( $r_s = 0.503$ ), implying that digital literacy enhances the ability to share research outputs and engage in scholarly collaborations. However, its relatively lower correlation with institutional support ( $r_s = 0.408$ ) suggests that while faculty competence is strong, institutional systems may not be fully optimized to support digital research practices.

Technology integration in teaching also shows strong, consistent correlations, particularly with research capability ( $r_s = 0.643$ ) and knowledge dissemination ( $r_s = 0.615$ ). This indicates that faculty who effectively integrate technology into instruction are also more active in producing and disseminating research outputs. Similarly, data-driven decision-making shows strong relationships with knowledge dissemination ( $r_s = 0.622$ ) and collaborative engagement ( $r_s = 0.610$ ), suggesting that the use of analytics and evidence-based practices enhances both collaboration and knowledge sharing. Meanwhile, adoption of new business models demonstrates moderate to strong correlations across all variables, particularly with research capability ( $r_s = 0.611$ ), reflecting

the role of innovative institutional practices (e.g., digital platforms, flexible learning systems) in supporting faculty research productivity. Overall, the results indicate that digital transformation is a significant driver of research and development, with digital competence and technology integration emerging as the most influential factors.

Recent literature highlights the critical role of digital transformation in enhancing faculty research productivity and academic engagement. Digital competence, in particular, has been identified as a strong predictor of research capability, as it enables faculty to utilize advanced research tools, access global databases, and conduct data-intensive studies (Rathod et al., 2025). Studies further emphasize that digitally competent faculty are more likely to engage in scholarly writing, publish in high-impact journals, and participate in international research collaborations (Hasani, 2024). These findings support the strong correlation observed between digital competence and research capability in the present study.

Moreover, technology integration, data-driven decision-making, and innovative institutional models play significant roles in fostering collaboration and knowledge dissemination. Research shows that integrating digital technologies into teaching enhances faculty engagement in research by promoting interactive learning environments and facilitating access to real-time data (Mhlongo et al., 2023). Data-driven practices have also been linked to improved research outcomes, as they allow faculty to make evidence-based decisions and contribute to data-informed scholarship (Brazauskienė, 2025). Additionally, the adoption of new business models in education, such as digital platforms and hybrid systems, supports research collaboration and dissemination by expanding access to global academic networks (Mulenga & Shilongo, 2025). These studies collectively affirm that digital transformation significantly enhances multiple dimensions of research and development.

From the lens of the Technology Acceptance Model, the findings highlight how faculty perceptions of technology influence their engagement in research and development activities (Dianati et al., 2022). The strong relationship between digital competence and research capability suggests that faculty who perceive digital tools as useful and easy to use are more likely to adopt them in their research processes (Sari, 2025). Technology integration in teaching and data-driven decision-making further reflects high perceived usefulness, as these tools directly enhance efficiency in knowledge creation, collaboration, and dissemination (Kayumova et al., 2024). The moderate correlation with institutional support may indicate barriers related to perceived ease of use or system accessibility within the organization (Camilleri et al., 2025). Additionally, the adoption of new business models aligns with behavioral intention to use technology, reinforcing sustained engagement in digital research practices (Böttcher et al., 2024). Thus, the results confirm that technology acceptance is a key determinant of leveraging digital transformation to improve research productivity and collaboration.

The findings were also explained using Diffusion of Innovations Theory, which emphasizes how new technologies and practices spread within a social system over time (Mbatha, 2024). The significant positive relationships indicate that digital transformation practices, such as digital competence and technology integration, are being adopted and diffused among faculty members. Faculty with high digital competence may serve as early adopters or opinion leaders, influencing peers to embrace digital research tools and collaborative platforms. The strong correlations with research capability and knowledge dissemination suggest that as these innovations are communicated and observed, they become embedded in academic practices, enhancing overall research productivity. Furthermore, the moderate relationship with institutional support implies that while adoption is progressing, organizational structures may still be catching up to fully facilitate widespread diffusion. Overall, the results demonstrate that the diffusion process of digital innovations plays a crucial role in strengthening research and development outcomes in higher education (Silva et al., 2022).

These findings implied that private schools should intensify digital transformation initiatives to further strengthen faculty research and development. Given the strong influence of digital competence and technology integration on research capability and dissemination, institutions should invest in advanced digital skills training, research technologies, and data analytics tools. Additionally, enhancing institutional support systems, particularly those aligned with digital research infrastructure, can address gaps in faculty utilization of resources. Schools should also promote data-driven cultures and innovative educational models to facilitate collaboration

and knowledge sharing. By strategically aligning digital transformation efforts with research development goals, institutions can create a more dynamic, efficient, and globally competitive academic environment.

### **Predictors of Schools' Resilience During Disruptive Events**

Table 6 presents the regression analysis identifying key predictors of schools' resilience during disruptive events, with research integration in teaching and data-driven decision-making as independent variables. The regression model shows that both predictors have statistically significant positive effects on resilience, as indicated by their p-values ( $p = 0.000$ ). Specifically, research integration in teaching ( $\beta = 0.445$ ,  $t = 4.18$ ) has a stronger coefficient compared to data-driven decision making ( $\beta = 0.255$ ,  $t = 4.65$ ), suggesting that integrating research into instructional practices is the more influential predictor of resilience. This implies that faculty who embed research in teaching contribute more effectively to institutional adaptability and continuity during disruptions.

The regression equation indicates that for every unit increase in research integration, resilience increases by 0.445 units. In contrast, a unit increase in data-driven decision-making increases resilience by 0.255 units. The constant (0.038) is not statistically significant ( $p = 0.907$ ), suggesting that resilience is primarily explained by the predictor variables rather than baseline factors. The R-squared value of 55.90% indicates that more than half of the variability in school resilience is explained by the two predictors, reflecting a strong model fit. However, the adjusted  $R^2$  (52.86%) shows a slight reduction when accounting for the number of predictors, and the relatively low predicted  $R^2$  (12.40%) suggests limited generalizability of the model to new data. Overall, the findings highlight that both pedagogical integration of research and evidence-based decision-making are critical drivers of institutional resilience, although additional variables may further strengthen predictive power.

Recent studies emphasize that integrating research into teaching significantly enhances institutional resilience by fostering adaptability, critical thinking, and innovation among faculty and students (Skenderi & Skenderi, 2023). Research-informed teaching enables educators to continuously update content, apply evidence-based practices, and respond effectively to disruptions such as shifts to online learning or crises (Green, 2026). Furthermore, institutions that promote research integration are better positioned to generate context-specific solutions and maintain academic continuity during uncertain times (Elhassan, 2025). This supports the strong predictive value of research integration in the present study.

Similarly, data-driven decision-making has been widely recognized as a crucial factor in strengthening organizational resilience in education. The use of learning analytics, institutional data systems, and evidence-based planning enables schools to make timely and informed decisions, optimize resource allocation, and improve academic outcomes (Munagandla et al., 2024). Studies also show that data-driven cultures enhance institutional responsiveness and strategic agility, particularly during disruptive events such as pandemics or technological transitions (Ayeoribe & Ayeoribe, 2025). These findings aligned with the significant contribution of data-driven decision-making observed in this study, confirming its role as a key enabler of resilience.

The findings implied that private schools should prioritize strengthening research integration in teaching and institutionalizing data-driven decision-making practices to enhance resilience during disruptive events. Schools should encourage faculty to adopt research-based instructional approaches and support the integration of current research into curricula. Additionally, investing in data analytics systems, training faculty in data interpretation, and embedding evidence-based decision-making into institutional processes can improve responsiveness and adaptability. Given the relatively low predictive  $R^2$ , future initiatives should also consider incorporating additional factors—such as leadership, digital infrastructure, and organizational culture—to develop a more comprehensive resilience framework.

## **SUMMARY, FINDINGS, CONCLUSION, RECOMMENDATIONS**

### **Summary**

The study investigated the role of research and development in promoting faculty innovation and digital transformation. Specifically, this study seeks to answer the following questions: (1) What is the level of faculty

innovation in terms of creative pedagogy, research integration in teaching, problem-solving initiative, and continuous professional development? (2) What is the level of the faculty's digital transformation in terms of digital competence, technology integration in teaching, data-driven decision-making, and adoption of new business models? (3) What is the level of faculty research and development in terms of research capability, institutional support, collaborative engagement, and knowledge dissemination? (4) Is there a significant relationship between the faculty innovation and research and development? (5) Is there a significant relationship between faculty digital transformation and research and development? (6) Faculty innovation and digital transformation are predictors of research and development.

This study utilized a descriptive correlational design. among 125 private school faculty who were randomly chosen in the selected private schools in one of the municipalities of Misamis Occidental during the school year 2025-2026. Researcher-made questionnaires were used to collect the data, which were analyzed using Mean and Standard Deviation, Pearson's  $r$  correlation coefficient, and Regression Analysis.

## Findings

The following are the findings of the study:

1. The level of faculty innovation is very high.
2. The level of the faculty's digital transformation is very good.
3. The faculty has a very high level of research and development.
4. There is a significant relationship between the faculty innovation and research and development.
5. There is a significant relationship between faculty digital transformation and research and development
6. Research integration in teaching and data-driven decision making was found to be the predictor of faculty digital transformation.

## Conclusions

- a. The teachers are actively engaging in creative and progressive teaching practices that enhance educational outcomes.
- b. The teachers are effectively integrating digital technologies into their instructional processes.
- c. There is a strong institutional commitment to advancing knowledge and improving teaching practices.
- d. The relationship between faculty innovation and research and development suggests that increased research engagement enhances innovative teaching practices.
- e. The relationship between faculty digital transformation and research and development implies that research activities contribute to the effective adoption of digital technologies.
- f. Identifying research integration in teaching and data-driven decision-making as predictors highlights their crucial role in strengthening faculty digital transformation efforts.

## Recommendations

1. School heads may sustain and further support innovative teaching practices by providing continuous training, resources, and recognition for creative instructional strategies.
2. Institutions may strengthen digital infrastructure and offer ongoing capacity-building programs to enhance teachers' effective use of educational technologies.

3. Research directors may maintain and expand institutional support for research and development through funding, incentives, and collaborative initiatives.
4. School heads may encourage greater faculty involvement in research activities to further enhance innovation in teaching practices.
5. Teachers integrate research-based approaches into digital initiatives to ensure effective and evidence-based adoption of technology in instruction.
6. Schools may promote research integration and data-driven decision making by providing training in data analytics and embedding these practices into teaching frameworks, as they are critical to successful digital transformation.
7. Future researchers may explore additional variables and contexts influencing digital transformation and innovation in education to provide a more comprehensive understanding of its long-term impact.

## REFERENCES

1. Abbasi, B. N., Wu, Y., & Luo, Z. (2025). Exploring the impact of artificial intelligence on curriculum development in global higher education institutions. *Education and Information Technologies*, 30(1), 547-581.
2. Adhikari, D. R., & Shrestha, P. (2023). Knowledge management initiatives for achieving sustainable development goal 4.7: higher education institutions' stakeholder perspectives. *Journal of Knowledge Management*, 27(4), 1109-1139.
3. Ahmed, N. (2025). Digital transformation strategy and faculty performance in Omani universities: The mediating role of digital transformation. *Problems and Perspectives in Management*, 23(3), 700. <https://tinyurl.com/mpbwym5d> April 20,2026
4. Aithal, P. S., & Aithal, S. (2023). How to empower educators through digital pedagogies and faculty development strategies. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 7(4), 139-183. <https://tinyurl.com/4wamaypj>
5. Al Breiki, M., Al Abri, A., Al Moosawi, A. M., & Alburaiqi, A. (2023). Investigating science teachers' intention to adopt virtual reality through the integration of diffusion of innovation theory and theory of planned behaviour: the moderating role of perceived skills readiness. *Education and information technologies*, 28(5), 6165-6187.
6. Alenezi, M., Wardat, S., & Akour, M. (2023). The need of integrating digital education in higher education: Challenges and opportunities. *Sustainability*, 15(6), 4782.
7. Alhubaishy, A., & Aljuhani, A. (2021). The challenges of instructors' and students' attitudes in digital transformation: A case study of Saudi Universities. *Education and Information Technologies*, 26(4), 4647-4662. <https://tinyurl.com/4awmtnwd>
8. Ali, R., & Georgiou, H. (2024). A process for institutional adoption and diffusion of blended learning in higher education. *Higher Education Policy*, 1-22.
9. Aljanazrah, A., Yerousis, G., Hamed, G., & Khlaif, Z. N. (2022, October). Digital transformation in times of crisis: Challenges, attitudes, opportunities and lessons learned from students' and faculty members' perspectives. In *Frontiers in Education* (Vol. 7, p. 1047035). Frontiers Media SA.
10. Amador, A. A. (2025). Adoption and Diffusion of a Learning Management System as an Instructional Tool: A Community College Case Study. Teachers College, Columbia University.
11. Amini, M., Rahmani, A., Abedi, M., Hosseini, M., Amini, M., & Amini, M. (2021). Mahamgostar. com as a case study for adoption of laravel framework as the best programming tools for php based web development for small and medium enterprises. *Journal of Innovation & Knowledge*, ISSN, 100-110. <https://tinyurl.com/y4xzzhrd>
12. Anthony Jr, B., Kamaludin, A., Romli, A., Raffei, A. F. M., Phon, D. N. A. E., Abdullah, A., & Ming, G. L. (2022). Blended learning adoption and implementation in higher education: A theoretical and systematic review. *Technology, Knowledge and Learning*, 27(2), 531-578.

13. Anvarovna, T. S. (2026). ENHANCING THE INNOVATIVE POTENTIAL OF FUTURE TEACHERS THROUGH A CREATIVE APPROACH IN PEDAGOGICAL EDUCATION. *Shokh Articles Library*, 1(1), 1075-1080. <https://tinyurl.com/ymj6549e>
14. Anwar, S., Menekse, M., Guzey, S., & Bryan, L. A. (2022). The effectiveness of an integrated STEM curriculum unit on middle school students' life science learning. *Journal of Research in Science Teaching*, 59(7), 1204-1234.
15. Arsalan, M., Mubin, O., & Al Mahmud, A. (2024). Dynamic interactions of research, publication, researchers, institutions, and countries: A Quintuple Helix model perspective on research impact. *Malaysian Journal of Library and Information Science*, 29(2), 19-59.
16. Asbari, M., & Asbari, D. A. F. (2025). The Dynamics of Student Knowledge Creation through SECI: A Qualitative Exploration in the Indonesian Context. *Indonesian Journal of Management and Economic Research (IJOMER)*, 2(01), 29-39.
17. Atobishi, T., Moh'd Abu Bakir, S., & Nosratabadi, S. (2024). How do digital capabilities affect organizational performance in the public sector? The mediating role of the organizational agility. *Administrative Sciences*, 14(2), 37.
18. Aurangzeb, W., Kashan, S., & Rehman, Z. U. (2024). Investigating technology perceptions among secondary school teachers: A systematic literature review on perceived usefulness and ease of use. *Academy of Education and Social Sciences Review*, 4(2), 160-173.
19. Ayeoribe, A. E., & Ayeoribe, O. P. (2025). Digital Transformation And Organizational Agility: How Emerging Technologies Drive Firm Competitiveness, Resilience, And Strategic Responsiveness In Turbulent Economic Environments And Contemporary Business Markets.
20. Badawy, H. R., Alkaabi, A. M., Qablan, A., Abdallah, A., Tairab, H., & Badawy, H. R. (2025). The impact of STREAM on teaching, learning, and professionalism: investigating teachers' and lead teachers' perspectives. *SN Social Sciences*, 5(5), 69.
21. Basantes-Andrade, A., Casillas-Martin, S., Cabezas-Gonzalez, M., Naranjo-Toro, M., & Guerra-Reyes, F. (2022). Standards of teacher digital competence in higher education: A systematic literature review. *Sustainability*, 14(21), 13983.
22. Basilotta-Gómez-Pablos, V., Matarranz, M., Casado-Aranda, L. A., & Otto, A. (2022). Teachers' digital competencies in higher education: a systematic literature review. *International journal of educational technology in higher education*, 19(1), 8.
23. Baylan, S. L. (2023). A contextual analysis of the university research agenda of select teacher education institutions in the Philippines: policy implications and future directions. *Asian Journal of University Education (AJUE)*, 19(3), 662-675.
24. Beach, A. L., Sorcinelli, M. D., Austin, A. E., & Rivard, J. K. (2023). Faculty development in the age of evidence: Current practices, future imperatives. Routledge. <https://tinyurl.com/za222abw>
25. Bendtsen, M., Forsman, L., & Björklund, M. (2022). Exploring empowering practices for teachers' sustainable continuing professional development. *Educational Research*, 64(1), 60-76.
26. Bhatti, M. A., Alyahya, M., & Alshiha, A. A. (2022). Research culture among higher education institutions of Saudi Arabia and its impact on faculty performance: assessing the role of instrumentality, research infrastructure, and knowledge production. *Educational Sciences: Theory & Practice*, 22(2).
27. Borozan, M., & Bushnaq, T. (2025). Professional competences for the innovation of education in the 21st century from the perspective of pedagogical action research. *Annals of the University of Craiova, Series Psychology, Pedagogy*, 47(1), 46-59. <https://tinyurl.com/ykfpt4va>
28. Böttcher, T. P., Empelmann, S., Weking, J., Hein, A., & Krcmar, H. (2024). Digital sustainable business models: Using digital technology to integrate ecological sustainability into the core of business models. *Information Systems Journal*, 34(3), 736-761.
29. Bouncken, R. B., Aslam, M. M., Gantert, T. M., & Kallmuenzer, A. (2023). New work design for knowledge creation and sustainability: An empirical study of coworking-spaces. *Journal of Business Research*, 154, 113337.
30. Brazauskienė, E. (2025). Educational Decision-Making in Digital Education: A Conceptual Review of Data-Driven, Data-Based, and Data-Informed Approaches. *Revista de Pedagogie Digitala*, 4(1), 63-72.

31. Çakıroğlu, Ü., Saylan, E., Çevik, İ., Mollamehmetoğlu, M. Z., & Timuçin, E. (2022). Faculty adoption of online teaching during the Covid-19 pandemic: A lens of diffusion of innovation theory. *Australasian Journal of Educational Technology*, 38(3), 87-103.
32. Camilleri, P., Watted, A., & Attard Tonna, M. (2025). Investigating teachers' changing perceptions towards MOOCs through the technology acceptance model. *Education Sciences*, 15(10), 1395.
33. Casciani, D., Chkanikova, O., & Pal, R. (2022). Exploring the nature of digital transformation in the fashion industry: opportunities for supply chains, business models, and sustainability-oriented innovations. *Sustainability: Science, Practice and Policy*, 18(1), 773-795. <https://tinyurl.com/5n8j2hes>
34. Cassottana, B., Biswas, P. P., Balakrishnan, S., Ng, B., Mashima, D., & Sansavini, G. (2022). Predicting resilience of interdependent urban infrastructure systems. *IEEE Access*, 10, 116432-116442. <https://tinyurl.com/mr2hp993>
35. Chen, P., & Kim, S. (2023). The impact of digital transformation on innovation performance-The mediating role of innovation factors. *Heliyon*, 9(3). <https://tinyurl.com/2t5ccym8> April 20,2026
36. Culduz, M. (2024). The impact of educational leadership in improving the learning experience. In *Promoting crisis management and creative problem-solving skills in educational leadership* (pp. 168-189). IGI Global Scientific Publishing.
37. De Bem Machado, A., Secinaro, S., Calandra, D., & Lanzalonga, F. (2022). Knowledge management and digital transformation for Industry 4.0: a structured literature review. *Knowledge Management Research & Practice*, 20(2), 320-338.
38. Deroncele-Acosta, A., Palacios-Núñez, M. L., & Toribio-López, A. (2023). Digital transformation and technological innovation on higher education post-COVID-19. *Sustainability*, 15(3), 2466.
39. Dianati, S., Taptamat, N., Uchiyama, A., & Akagawa, N. (2022). Factors that influence Translation and Interpreting technology adoption by university instructors, through the lens of the Technology Acceptance Model (TAM). *Journal of Translation and Language Studies*, 3(1), 12-28.
40. Dibra, S. (2023). Exploring the Business Model and Organizational Innovation of Vocational Schools: A Case Study of Development Units. *Humanities*, 2(1), 1-13.
41. Durnali, M., & Gökbulut, B. (2025). Empowering Masters of Creative Problem Solvers: The Impact of STEM Professional Development Training on Teachers' Attitudes, Self-Efficacy, and Problem-Solving Skills. *Journal of Intelligence*, 13(10), 132.
42. Duyen, T. T. (2024). The interplay between faculty research and development activities and effective teaching practices in higher education. *Vinh University Journal of Science*. <https://tinyurl.com/yzzctcnk>
43. Edu, N. (2025). Enhancing teachers' professional development for more productive society. *International Journal of Innovative Development and Policy Studies*, 13(1), 197-203.
44. Elhassan, H. A. M. (2025). Implementation challenges of project based learning during crisis situations: strategies for educational continuity and quality. *British Journal of Teacher Education and Pedagogy*, 4(1), 01-11.
45. Eli, T. (2021). Students' perspectives on the use of innovative and interactive teaching methods at the University of Nouakchott Al Aasriya, Mauritania: English department as a case study. *International Journal of Technology innovation and Management (Ijtim)*, 1(2), 90-104. <https://tinyurl.com/5ayafu85> September 25,2025
46. Emmanuel, O. T., Akintola, A. A., Ayomide, L. Q., Oluwaseyi, A. P., & Munirat, B. K. (2025). The Relationship between Resilience and Disruptive Behaviour among In-School Adolescents in Lagos State. <https://tinyurl.com/mvrsv7hf>
47. Fitzgerald, H. E., Karen, B., Sonka, S. T., Furco, A., & Swanson, L. (2023). The centrality of engagement in higher education. In *Building the field of higher education engagement* (pp. 201-219). Routledge.
48. Fobert, B. J. (2024). *Empowering Educators: Practitioner-Directed Professional Development Approach for Technology Integration* (Doctoral dissertation, Saint Mary's College of California).
49. Fuad, D. R. S. M., Musa, K., & Hashim, Z. (2022). Innovation culture in education: A systematic review of the literature. *Management in Education*, 36(3), 135-149.
50. Ghimire, A., & Edwards, J. (2024). Generative AI adoption in classroom in context of technology acceptance model (TAM) and the innovation diffusion theory (IDT). *arXiv preprint arXiv:2406.15360*.
51. Gilmour, P. M. (2024). Enhancing research collaboration within a large university department. *Innovations in Education and Teaching International*, 61(4), 622-635.

52. Gkrimpizi, T., Peristeras, V., & Magnisalis, I. (2023). Classification of barriers to digital transformation in higher education institutions: Systematic literature review. *Education sciences*, 13(7), 746. <https://tinyurl.com/374nhb4p>
53. Goffer, M. A., Chakraborty, P., Rahman, H., Barikdar, C. R., Das, N., Hossain, S., & Hossin, M. E. (2024). Leveraging predictive analytics in management information systems to enhance supply chain resilience and mitigate economic disruptions. *Educ. Adm. Theory Pract*, 30(4), 11134-11144. <https://tinyurl.com/3vxbk4f5>
54. Gonugunta, K. C., & Leo, K. (2024). Role of Data-Driven Decision Making in Enhancing Higher Education Performance: A Comprehensive Analysis of Analytics in Institutional Management. *International Journal of Acta Informatica*, 3(1), 149-159.
55. Gorrell, A. (2023). The impact of digital transformation on academic work. *Studies in Technology Enhanced Learning*, 3(2). <https://tinyurl.com/789446fy> April 20, 2026
56. Grant, R., & Phene, A. (2022). The knowledge based view and global strategy: Past impact and future potential. *Global Strategy Journal*, 12(1), 3-30.
57. Green, W. F. (2026). Preparing Future Educators for the Digital Shift: Strategies for Remote and Hybrid Teaching. In *Preparing Educators for Complexity and Change: Resilient Pedagogies, Digital Innovation, and Ethical Futures* (pp. 93-138). IGI Global Scientific Publishing.
58. Grunwald, G., Kara, A., & Spillan, J. E. (2024). Sustainable innovations through project partnerships at higher education institutions: Challenges and implications for stakeholder engagement. *Management Decision*.
59. Guo, Z., & Xu, Y. (2025). AI-empowered integrated reform of teacher education: The experience of a Chinese university. *Education and Lifelong Development Research*, 2(1), 30-38. <https://tinyurl.com/2s3hw4fa>
60. Gutiérrez-Leefmans, M., Picazo-Vela, S., & Kareem, O. (2025). Adoption of artificial intelligence in higher education: a diffusion of innovation approach. *The TQM Journal*.
61. Hamzah, F., Abdullah, A. H., & Ma, W. (2024). Advancing education through Technology Integration, innovative pedagogies and emerging trends: A systematic literature review. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 41(1), 44-63.
62. Hasani, A. (2024). Analysis of the Relationship between Digital Literacy Program Development and Lecturer Productivity in Higher Education. *Nidhomul Haq: Jurnal Manajemen Pendidikan Islam*, 9(3), 630-647.
63. Heine, S., Krepf, M., & Koenig, J. (2023). Digital resources as an aspect of teacher professional digital competence: One term, different definitions—a systematic review. *Education and Information Technologies*, 28(4), 3711-3738.
64. Hodges, B. D., & Horsley, T. (2025). Faculty development for research capacity building. *Faculty development in the health professions: A focus on research and practice*, 79-99. <https://tinyurl.com/tanvve5e>
65. Honcharuk, V., Bugaenko, T., Shevchuk, I., Liubchenko, N., & Bezlatnia, L. (2024). Educational innovation and digital transformation: interconnection and prospects for Ukraine. *Futurity Education*, 4(2), 61-85.
66. Ibarra-Cisneros, M. A., Reyna, J. B. V., & Hernández-Perlines, F. (2023). Interaction between knowledge management, intellectual capital and innovation in higher education institutions. *Education and Information Technologies*, 28(8), 9685-9708.
67. Ibrahim, A., & Shiring, E. (2022). The Relationship between Educators' Attitudes, Perceived Usefulness, and Perceived Ease of Use of Instructional and Web-Based Technologies: Implications from Technology Acceptance Model (TAM). *International Journal of Technology in Education*, 5(4), 535-551.
68. Idrees, H., Xu, J., Haider, S. A., & Tehseen, S. (2023). A systematic review of knowledge management and new product development projects: Trends, issues, and challenges. *Journal of Innovation & Knowledge*, 8(2), 100350.
69. Isabirye, A. K., & Moloi, K. C. (2025). Beyond The Boundaries: Interdisciplinary Collaboration As The Engine of Innovation and Impact at the Faculty Level. *Journal of Ecohumanism*, 4(4), 2155-2168.

70. Jain, A., Naik, K. R., Kakade, K., Bhanot, S., & Kulkarni, S. C. (2025). Reimagining management education: Navigating the shift to education 4.0 in the digital era. *The International Journal of Management Education*, 23(2), 101182.
71. Jarilkapovich, M. A. (2024). USE OF PEDAGOGICAL METHODS BASED ON THE MODERN EDUCATIONAL PROGRAM TO INCREASE THE EFFECTIVENESS OF EDUCATION. *European International Journal of Pedagogics*, 4(06), 26-33.
72. Jong, M. S. Y., Chen, G., Tam, V., Hue, M. T., & Chen, M. (2022). Design-based research on teacher facilitation in a pedagogic integration of flipped learning and social enquiry learning. *Sustainability*, 14(2), 996.
73. Joseph, O. B., Onwuzulike, O. C., & Shitu, K. (2024). Digital transformation in education: Strategies for effective implementation. *World Journal of Advanced Research and Reviews*, 23(2), 2785-2799.
74. Kallmuenzer, A., Mikhaylov, A., Chelaru, M., & Czakon, W. (2025). Adoption and performance outcome of digitalization in small and medium-sized enterprises. *Review of Managerial Science*, 19(7), 2011-2038. <https://tinyurl.com/mvkk45t6>
75. Kayumova, M., Akbarova, S., Azizova, M., Hojiyeva, I., Karimova, F., & Makhmudova, F. (2024, December). Data Driven Teaching and Real Time Decision Making in Education Management. In *Proceedings of the 8th International Conference on Future Networks & Distributed Systems* (pp. 756-763).
76. Kompella, L. (2024). Service innovations, value-driven business model, and institute growth: Insights from a higher-education institute. *International Journal of Educational Management*, 38(6), 1735-1751.
77. Kouskoura, A., Kalliontzi, E., Skalkos, D., & Bakouros, I. (2024). Assessing the key factors measuring regional competitiveness. *Sustainability*, 16(6), 2574.
78. Kumar, A., Atwa, H., Shehata, M., Al Ansari, A., & Deifalla, A. (2022). Faculty development programmes in medical education in the Eastern Mediterranean Region: a systematic review. *Eastern Mediterranean Health Journal*, 28(5), 362-380. <https://tinyurl.com/2p9u54bz> September 25, 2025
79. Li, Y., & Xu, L. (2024). Exploring the influence of teachers' motivation, self-efficacy, and institutional support on their research engagement: A study of Chinese university EFL teachers. *System*, 121, 103272.
80. Liu, C. C., Wang, D., Wang, H. J., Wang, Y., & Tu, Y. F. (2025). The effect of peer assessment-based collaborative concept mapping on pre-service teachers' perceptions on smart learning environments. *Journal of Research on Technology in Education*, 1-23.
81. Lu, H. P., & Wang, J. C. (2023). Exploring the effects of sudden institutional coercive pressure on digital transformation in colleges from teachers' perspective. *Education and Information Technologies*, 28(12), 15991-16015.
82. Lu, J., & Zhang, L. (2025). "Research Learning Is a Never-Ending Journey": A Narrative Case Study of Interplay of Agency and Researcher Identity Construction. *International Journal of Applied Linguistics*.
83. Luo, C., Yunus, M. M., & Mansor, A. Z. (2025). The Relationship between Aesthetic Education Pedagogy and Innovative Skills: A Mediation Analysis Based on Teacher Competency. *Educational Sciences: Theory & Practice*, 25(2).
84. Magallanes, K., Chung, J. Y., & Lee, S. (2022, May). The Philippine teachers concerns on educational reform using concern based adoption model. In *Frontiers in Education* (Vol. 7, p. 763991). Frontiers Media SA. <https://tinyurl.com/cha5fec3>
85. Mahmoud, E. (2023). Practical technology integration into mathematics teaching in elementary education: Instructional design model, teaching strategies, and assessment techniques. *Remittances Review*, 8(4), 2912-2932.
86. Maki, P. L., & Shea, P. (Eds.). (2023). *Transforming digital learning and assessment: A guide to available and emerging practices and building institutional consensus*. Taylor & Francis.
87. Malami, A. S., & Onen, D. (2023). Impact of continuous professional development on academic staff performance in Sokoto State University, Sokoto, Nigeria. *Zamfara International Journal of Education*, 3(5), 163-172.
88. Maqsood, N., Prendeville, P., & Bhatti, S. H. (2024). Measuring the impact of faculty development programmes on business schools' performance in Pakistan. *Journal of Education for Business*, 99(5), 312-322. <https://tinyurl.com/2vsjpd8c>

89. Masatoshi, H. (2025). Higher education for economic development: contexts of escaping low-and-lower-middle-income trap in ASEAN. *Discover Education*, 4(1), 288.
90. Mbatha, B. (2024). Diffusion of innovations: How adoption of new technology spreads in society. In *Information, knowledge, and technology for teaching and research in Africa: Human machine interaction and user interfaces* (pp. 1-18). Cham: Springer Nature Switzerland.
91. McCowan, T., Parr, A., Binagwaho, A., Davies, A., Mbow, C., Hessen, D. O., ... & Shijun, T. (2022). Knowledge-driven actions: Transforming higher education for global sustainability.
92. Menzli, L. J., Smirani, L. K., Boulahia, J. A., & Hadjouni, M. (2022). Investigation of open educational resources adoption in higher education using Rogers' diffusion of innovation theory. *Heliyon*, 8(7).
93. Mhlanga, D. (2022). Digital transformation in education: relevant paradigms and theories of teaching and learning in the industry 4.0. In *Intelligent systems in digital transformation: Theory and applications* (pp. 453-470). Cham: Springer International Publishing.
94. Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. *Heliyon*, 9(6).
95. Mironova, N., Koptieva, H., Liganenko, I., Sakun, A., & Chernyak, D. (2022). Modeling the selection of innovative strategy for development of industrial enterprises. *innovation*, 8(9), 10. <https://tinyurl.com/3zyrb8hk>
96. Misky, G. J., Sharpe, B., Weaver, A. C., Niranjani-Azadi, A., Gupta, A., Rennke, S., ... & Frank, M. (2023). Faculty development in academic hospital medicine: a scoping review. *Journal of general internal medicine*, 38(8), 1955-1961. <https://tinyurl.com/yztuu4ue>
97. Mohamed Hashim, M. A., Tlemsani, I., & Duncan Matthews, R. (2022). A sustainable university: Digital transformation and beyond. *Education and Information Technologies*, 27(7), 8961-8996. <https://tinyurl.com/5d6ts5dm> September 23, 2025
98. Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2022). Higher education strategy in digital transformation. *Education and information technologies*, 27(3), 3171-3195. <https://tinyurl.com/53e7bn2t>
99. Mondragon-Estrada, E., Kirschning, I., Nolasco-Flores, J. A., & Camacho-Zuñiga, C. (2023, August). Fostering digital transformation in education: technology enhanced learning from professors' experiences in emergency remote teaching. In *Frontiers in Education* (Vol. 8, p. 1250461). Frontiers Media SA. <https://tinyurl.com/4eabb3d4>
100. Moravec, J. W. Transforming education systems toward the knowmad paradigm. Edited Volume, 261.
101. Mpofo, S., & Chasokela, D. (2025). Data-informed decision-making: using analytics to drive strategic management in higher education. In *Building Organizational Capacity and Strategic Management in Academia* (pp. 103-138). IGI Global Scientific Publishing.
102. Mujtaba, G., & Khalid, W. (2025). DETERMINANTS OF LECTURER PERFORMANCE: INTEGRATING KNOWLEDGE, MOTIVATION, SUSTAINABILITY AND COMMITMENT THROUGH A JOB SATISFACTION PERSPECTIVE. *Journal of Media Horizons*, 6(4), 522-545. <https://tinyurl.com/mrdwp3hj>
103. Mulenga, R., & Shilongo, H. (2025). Hybrid and blended learning models: innovations, challenges, and future directions in education. *Acta Pedagogica Asiana*, 4(1), 1-13.
104. Munagandla, V. B., Dandyala, S. S. V., & Vadde, B. C. (2024). Improving educational outcomes through data-driven decision-making. *International Journal of Advanced Engineering Technologies and Innovations*, 3(1), 698-718.
105. Naidoo, D. T. (2023). Integrating TAM and IS success model: exploring the role of blockchain and AI in predicting learner engagement and performance in e-learning. *Frontiers in Computer Science*, 5, 1227749.
106. Nair, B. K. R., Bleasel, J., Mwangi, F., & Malau-Aduli, B. S. (2025). Reimagining faculty development: A paradigm shift from content to transformative learning processes. *Medical Teacher*, 47(6), 976-984.
107. Norman, E., Masruri, A., Wahid, J., & Hasbian, Y. (2025). Managing Teacher Competence Improvement through Leadership, Professional Development, and Digital Innovation: A Systematic Literature Review. *Journal of Educational Management Research*, 4(5), 2322-2348.
108. Nuamsamrarn, S., & Achwarin, N. (2023). A STRUCTURAL EQUATION MODEL OF THE DETERMINANTS AFFECTING STUDENTS' BEHAVIORAL INTENTION AND SATISFACTION

- TOWARDS BLENDED LEARNING OF ENGLISH AS A FOREIGN LANGUAGE AT A BANGKOK PUBLIC UNIVERSITY. *Journal of Education and Innovation*, 25(1), 36-45.
109. Ocampo, L., Aro, J. L., Evangelista, S. S., Maturan, F., Yamagishi, K., Mamhot, D., ... & Quiñones, R. (2022). Research productivity for augmenting the innovation potential of higher education institutions: An interpretive structural modeling approach and MICMAC analysis. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 148.
  110. Oliveira, K. K. D. S., & De Souza, R. A. (2022). Digital transformation towards education 4.0. *Informatics in Education*, 21(2), 283-309.
  111. Oluyinka, S. A., & Cusipag, M. N. (2024). Technology Continuance Theory in Support of Continual Intent to Use Learning Management System in the Philippines. *Kasetsart Journal of Social Sciences*, 45(4), 1279-1288.
  112. Onen, D. (2025). Enhancing Education Research Through Cross-Disciplinary Integration: A Systematic Literature Review. *Journal of Inquiry Based Activities*, 15(Special Issue), 1-21.
  113. Osman, Z., & Yatam, M. (2024). Unravelling Digital Transformation Acceptance in Online Flexible Distance Learning Higher Education Institutions. *International Journal of Academic Reserach in Economics and Management Sciences*, 13(2).
  114. Owan, V. J., Ameh, E., & Anam, E. G. (2024). Collaboration and institutional culture as mediators linking mentorship and institutional support to academics' research productivity. *Educational Research for Policy and Practice*, 23(1), 19-44.
  115. Owuondo, J. (2023). Fostering educational development and innovation in the global south: Incentivizing research and development (R&D). *International Journal of Research and Scientific Innovation (IJRSI)* | Doi, 10, 186.
  116. Palacios-Rodríguez, A., Llorente-Cejudo, C., & Cabero-Almenara, J. (2023, September). Educational digital transformation: new technological challenges for competence development. In *Frontiers in Education* (Vol. 8, p. 1267939). Frontiers Media SA.
  117. Parr, A. (2022). Knowledge-driven actions: transforming higher education for global sustainability (pp. 1-100). UNESCO.
  118. Perez, Z. O., Minyamin, A. V., Bagsit, R. D., Gimena, G. B., Dionaldo, W. V., Padillo, E. S., ... & Cabello, C. A. (2022). Research Capability of Faculty Members in Higher Education Institution: Basis for Research Management Plan. *Journal of Positive School Psychology*, 6(3).
  119. Petancio, J. A. M., Pogoy, A. M., Montalbo, I. C., & Pepito, G. M. (2024). Virtual Learning Environment in a Philippine Higher Education Institution: Acceptance and Practices. *International Journal of Information and Education Technology*, 14(5).
  120. Pierson, A. L. (2022). Teacher perceptions of technology-Enhanced, collaborative, project-based learning on students in mixed-ability classrooms (Doctoral dissertation, Walden University).
  121. Purwanto, A., Purba, J. T., Bernarto, I., & Sijabat, R. (2023). Investigating the role digital transformation and human resource management on the performance of the universities. *International Journal of Data and Network Science*, 7. <https://tinyurl.com/mr49synz>
  122. Rafi, S. M., & Abdullah, E. M. E. BUSINESS MODEL APPLICATION IN HIGHER EDUCATION INSTITUTIONS: A STRUCTURED REVIEW. *Journal of Modern Education*, 6(22), 758-773.
  123. Randles, S., Dewick, P., Hannan, E., Nicholson, D. T., Rietbergen, M., Taylor, C., ... & Withycombe Keeler, L. (2022). Applying enquiry and problem based learning to mission-oriented innovation policy: from policy to pedagogy to teaching and learning practice. *Journal of International Education in Business*, 15(1), 52-73.
  124. Rasheed, Z. (2023). Educational Innovation amidst Globalization: Higher Education Institutions and Societal Integration. *Igmin Research*, 1(2), 154-159.
  125. Rathod MS, G., Savitha, K., & Harish, C. K. (2025). Empowering Faculty Research through Academic Libraries: Advancing Information Literacy, Digital Access, and Collaborative Scholarship. *Journal of Advances in Library and Information Science*, 14(3), 212-224.
  126. Revenko, I., Hlianenko, K., Sosnova, M., Vlasenko, R., & Kolodina, L. (2024). The exploration of pedagogical approaches and methods that are designed to stimulate the creative thinking of students. *Cadernos de Educação Tecnologia e Sociedade*, 17(se1), 137-146.

127. Reyes, V. C. (2023). What is most important in education reform? The impact of leadership, innovation and partnerships. *International Journal of Leadership in Education*, 1-18.
128. Rodríguez-Abitia, G., & Bribiesca-Correa, G. (2021). Assessing digital transformation in universities. *Future Internet*, 13(2), 52. <https://tinyurl.com/4r44eayu> September 23, 2025
129. Rogozin, D., Solodovnikova, O., & Ipatova, A. (2022). How university teachers view the digital transformation of higher education. <https://tinyurl.com/4sj73ej4>
130. Rossoni, A. L., de Vasconcellos, E. P. G., & de Castilho Rossoni, R. L. (2024). Barriers and facilitators of university-industry collaboration for research, development and innovation: a systematic review. *Management Review Quarterly*, 74(3), 1841-1877.
131. Ruiz-Rojas, L. I., Salvador-Ullauri, L., & Acosta-Vargas, P. (2024). Collaborative working and critical thinking: Adoption of generative artificial intelligence tools in higher education. *Sustainability*, 16(13), 5367.
132. Sabri, S. M., Ismail, I., Anuar, N., Rahman, N. R. A., Abd Hamid, N. Z., & Abd Mutalib, H. (2024). A conceptual analysis of technology integration in classroom instruction towards enhancing student engagement and learning outcomes. *Integration*, 9(55), 750-769.
133. Sari, W. D. (2025). Exploring Teacher Perceptions of Deep Learning for Professional Development: A Technology Acceptance Model Approach. *Jurnal Ilmu Pendidikan*, 31(1), 115-124.
134. Saroyan, A. (2022). Fostering creativity and critical thinking in university teaching and learning: Considerations for academics and their professional learning.
135. Sawant, S. B., Mate, N. R., Mhetre, D. D., Patil, K. B., & Bajaj, R. (2023). Challenges and opportunities: Faculty development in private higher education institutions (HEIs). *Tuijin Jishu/Journal of Propulsion Technology*, 44(4), 3072-3080.
136. Sharplin, E., Nuranova, A., & Rocco, W. (2025). Embedding a Culture and Pedagogy of Social Practices in a University Learning and Teaching Centre: Policy, Connection, and Professional Learning. In *Exploring Academic Writing as Social Practice: Institutional Goals, Complexities and Possibilities in Central Asia* (pp. 25-49). Cham: Springer Nature Switzerland.
137. Shen, W., Xu, X., & Wang, X. (2022). Reconceptualising international academic mobility in the global knowledge system: towards a new research agenda. *Higher Education*, 84(6), 1317-1342.
138. Silva, T. I. M., Braz, P. R., Cavalcante, R. B., & Alves, M. (2022). Diffusion of innovations theory and its applicability in research studies on nursing and health. *Texto & Contexto-Enfermagem*, 31, e20210322.
139. Skenderi, F., & Skenderi, L. (2023). Fostering innovation in higher education: transforming teaching for tomorrow. *KNOWLEDGE-International Journal*, 60(2), 251-255.
140. Skrbinjek, V., Vičič Krabonja, M., Aberšek, B., & Flogie, A. (2024). Enhancing teachers' creativity with an innovative training model and knowledge management. *Education Sciences*, 14(12), 1381. <https://tinyurl.com/sb7sp2hy>
141. Sliwka, A., Klopsch, B., Beigel, J., & Tung, L. (2024). Transformational leadership for deeper learning: shaping innovative school practices for enhanced learning. *Journal of Educational Administration*, 62(1), 103-121.
142. Smith, C., & Gillespie, M. (2023). Research on professional development and teacher change: Implications for adult basic education. In *Review of Adult Learning and Literacy*, Volume 7 (pp. 205-244). Routledge.
143. Solomon, M. A., Gebremedhin, A. A., & Tigistu, K. W. (2023). Continuous professional development in higher education: A systematic review of its conceptualizations, trends and challenges (2011-2020). *Bahir Dar Journal of Education*, 23(1), 21-39.
144. Srinivas, T. A., & Varaprasad, R. (2023). Innovation through collaboration: Advancing higher education research. *Res. Rev. Adv. Robot*, 7, 1-10.
145. Steinert, Y., O'Sullivan, P. S., & Irby, D. M. (2024). The role of faculty development in advancing change at the organizational level. *Academic Medicine*, 99(7), 716-723. <https://tinyurl.com/8nv33x3k>
146. Tawil, S., Al-Tarawneh, A., & Alnoimi, O. A. A. M. (2026). Professional Development for Teachers in the Era of Digital Transformation: Strategies and Prospects. In *Artificial Intelligence for Sustainable*

- Innovation Management and Risk Management: A Systems (and Network) Perspective (pp. 553-565). Cham: Springer Nature Switzerland.
147. Taylor, K. L., & Colet, N. R. (2023). Making the shift from faculty development to educational development: A conceptual framework grounded in practice. In *Building teaching capacities in higher education* (pp. 139-167). Routledge.
148. Tebenko, V., Kutsai, N., Shashyna, M., Omelianenko, O., & Bakushevych, I. (2024). *Digital Transformation in Business: The Impact of Technology on Efficiency, Innovation and Competitiveness*. <https://tinyurl.com/ycytdy99>
149. Thelma, C. C., Sain, Z. H., Mpolomoka, D. L., Akpan, W. M., & Davy, M. (2024). Curriculum design for the digital age: Strategies for effective technology integration in higher education. *International Journal of Research*, 11(07), 185-201.
150. Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., ... & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and information technologies*, 28(6), 6695-6726.
151. Tiwari, S. P., & Fahrudin, A. (2024). Evolving school dynamics and emerging technologies in education: Critical success factors.
152. Truong, T. C., & Diep, Q. B. (2023). Technological spotlights of digital transformation in tertiary education. *IEEE Access*, 11, 40954-40966. <https://tinyurl.com/53n3bd6j> October 2, 2025
153. Villarino, G. (2022). Research Capability and Problems Encountered in Higher Education Institutions in the Philippines. *International Journal of Social Sciences: Current and Future Research Trends*, 14(1), 161-173.
154. Wang, X., Lee, C. F., Li, Y., & Zhu, X. (2023). Digital transformation of education: design of a “project-based teaching” service platform to promote the integration of production and education. *Sustainability*, 15(16), 12658.
155. Whitton, J., Parr, G., & Choate, J. (2022). Developing the education research capability of education-focused academics: Building skills, identities and communities. *Higher Education Research & Development*, 41(6), 2122-2136.
156. Xu, C., Zhu, S., Yang, B., Miao, B., & Duan, Y. (2023). A review of policy framework research on promoting sustainable transformation of digital innovation. *Sustainability*, 15(9), 7169.
157. Yordanova, Z. (2024, October). Innovation Processes in Universities: A Conceptual Model Incorporating Digital Transformation and Technological Innovations. In *International Conference on Advanced Research in Technologies, Information, Innovation and Sustainability* (pp. 105-117). Cham: Springer Nature Switzerland.
158. Yu, X., Wang, K., Chang, H., & Duan, Y. (2026). Organisational unlearning and radical innovation in enterprises: the mediating role of knowledge creation and the moderating effect of strategic flexibility. *Technology Analysis & Strategic Management*, 1-15.
159. Zarifis, A., & Efthymiou, L. (2022, March). The four business models for AI adoption in education: Giving leaders a destination for the digital transformation journey. In *2022 IEEE global engineering education conference (EDUCON)* (pp. 1868-1872). IEEE. <https://tinyurl.com/yckent7r>
160. Zhang, X., Chen, S., & Wang, X. (2023). How can technology leverage university teaching & learning innovation? A longitudinal case study of diffusion of technology innovation from the knowledge creation perspective. *Education and Information Technologies*, 28(12), 15543-15569.
161. Zhao, Y., Zhao, M., & Shi, F. (2024). Integrating moral education and educational information technology: A strategic approach to enhance rural teacher training in universities. *Journal of the Knowledge Economy*, 15(3), 15053-15093.
162. Zitha, I., Mokganya, G., & Sinthumule, O. (2023). Innovative strategies for fostering student engagement and collaborative learning among extended curriculum programme students. *Education Sciences*, 13(12), 1196.