

Exploring Faculty Performance Enhancement in the Digital Education Era Through AI-Driven Instructional Design and Data-Informed Decision-Making

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Abstract

The rapid digital transformation of higher education has significantly reshaped the roles and responsibilities of faculty members, requiring them to integrate artificial intelligence (AI) technologies and data-informed practices into teaching and academic activities. Despite the growing adoption of these technologies, little is known about how faculty members experience and interpret their use in enhancing professional performance. This study aims to explore faculty members' experiences of enhancing their performance through AI-driven instructional design and data-informed decision-making in the digital education era. A qualitative case study approach was employed to gain an in-depth understanding of participants' perspectives. Data were collected through semi-structured interviews with faculty members from higher education institutions who had experience using AI-supported instructional tools and educational data in their teaching practices. Document analysis and classroom observations were also conducted to provide contextual understanding and support data triangulation. The data were analyzed using thematic analysis following Braun and Clarke's six-phase framework. The findings revealed three overarching themes: (1) AI-driven instructional design as a catalyst for instructional innovation and personalized learning, (2) data-informed decision-making as a means of strengthening reflective teaching and academic decision-making, and (3) institutional and individual challenges influencing the sustainable integration of AI in higher education. Participants described AI as a supportive partner that enhanced instructional creativity, efficiency, and responsiveness to student learning needs while emphasizing that pedagogical expertise and professional judgment remained central to effective teaching. The study contributes to the understanding of faculty experiences in digitally transformed universities and offers practical insights for higher education institutions seeking to foster faculty development and responsible AI integration within contemporary educational environments.

Keywords: *Artificial intelligence, AI-driven instructional design, data-informed decision-making, faculty performance, digital higher education, qualitative case study*

INTRODUCTION

The rapid evolution of digital technologies has fundamentally transformed higher education worldwide, reshaping how faculty members design instruction, deliver learning experiences, assess student outcomes, and engage in academic research. The emergence of

artificial intelligence (AI), learning analytics, cloud computing, and digital collaboration platforms has accelerated the digital transformation of universities, requiring faculty members to acquire new competencies beyond traditional pedagogical expertise (OECD, 2021). Consequently, faculty performance is increasingly determined not only by subject matter expertise but also by the ability to leverage intelligent technologies and evidence-based decision-making to improve educational quality.

Artificial intelligence has emerged as one of the most disruptive technologies influencing higher education. Recent developments in generative AI, adaptive learning systems, intelligent tutoring systems, and automated assessment have enabled faculty members to personalize instruction, reduce administrative workload, generate learning materials, and provide immediate feedback to students (Holmes et al., 2022). AI-driven instructional design extends conventional instructional planning by integrating machine learning algorithms, predictive analytics, and natural language processing into curriculum development and instructional delivery, thereby enhancing teaching effectiveness and learning outcomes (Luckin et al., 2016). Universities worldwide are increasingly investing in AI-enabled educational technologies to improve instructional efficiency while supporting personalized learning environments.

Despite these technological advances, the successful implementation of AI in higher education depends largely on faculty readiness and instructional capability. While AI technologies can automate repetitive tasks and support personalized instruction, they cannot replace pedagogical judgment, instructional creativity, or the professional expertise of educators. Instead, AI functions as an augmentation tool that enhances faculty capabilities by providing timely insights, intelligent recommendations, and adaptive instructional support (Zawacki-Richter et al., 2019). Therefore, understanding how AI-driven instructional design contributes to faculty performance has become an important research agenda in educational management.

In addition to AI adoption, data-informed decision making has become another critical determinant of faculty effectiveness in digitally transformed universities. Educational institutions generate vast amounts of data through learning management systems, student assessments, classroom interactions, and institutional information systems. When properly analyzed, these data provide valuable evidence for improving instructional practices, identifying at-risk students, evaluating curriculum effectiveness, and supporting continuous quality improvement (Siemens & Long, 2011). Faculty members who possess strong data literacy are better equipped to interpret educational evidence, make informed instructional decisions, and adapt teaching strategies according to student learning needs (Mandinach & Gummer, 2016).

The increasing availability of educational data has shifted higher education from intuition-based teaching toward evidence-based instructional practices. Data-informed decisions enable faculty members to evaluate teaching effectiveness objectively, monitor student engagement continuously, and optimize learning interventions using measurable indicators rather than subjective perceptions (Marsh et al., 2006). Consequently, universities are encouraging faculty members to develop analytical competencies that support institutional accountability, educational innovation, and academic excellence.

Faculty performance itself has evolved considerably within the digital education era. Traditionally, faculty performance was primarily assessed through teaching effectiveness, research productivity, and community service. However, digital transformation has expanded performance expectations to include digital competence, technology integration, instructional innovation, interdisciplinary collaboration, responsiveness to educational analytics, and continuous professional development (Redecker, 2017). Faculty members are

now expected to function as digital educators capable of integrating emerging technologies into teaching while maintaining high standards of academic quality.

From a theoretical perspective, the Resource-Based View (RBV) provides a useful framework for explaining how AI-driven instructional design and data-informed decision making enhance faculty performance. RBV argues that valuable, rare, difficult-to-imitate, and well-organized organizational resources contribute to sustained competitive advantage (Barney, 1991). Within higher education, faculty members' digital competencies, AI utilization capabilities, and analytical decision-making skills constitute strategic intangible resources that improve instructional effectiveness, research productivity, and institutional competitiveness.

Although previous studies have independently examined artificial intelligence adoption, learning analytics, digital pedagogy, and faculty performance, relatively few have investigated the combined influence of AI-driven instructional design and data-informed decision making on faculty performance within a unified conceptual framework. Most existing research focuses either on student learning outcomes or technological adoption without simultaneously examining how intelligent instructional design and evidence-based decision making interact to enhance faculty effectiveness (Holmes et al., 2022; Zawacki-Richter et al., 2019). This gap limits a comprehensive understanding of how digital transformation influences academic performance at the faculty level.

Accordingly, this study aims to explore how faculty members enhance their performance in the digital education era through AI-driven instructional design and data-informed decision-making. Specifically, the study addresses three research questions: (1) How do faculty members experience the implementation of AI-driven instructional design in their teaching practices? (2) How do faculty members utilize data-informed decision-making to support instructional and academic activities? (3) How do these experiences shape faculty performance within the context of digital higher education? The findings are expected to enrich the understanding of the Resource-Based View from a qualitative perspective while providing practical insights for universities seeking to strengthen faculty capabilities, improve instructional quality, and support sustainable digital transformation.

Artificial Intelligence (AI)-driven instructional design refers to the systematic integration of artificial intelligence technologies into the planning, development, delivery, and evaluation of teaching and learning processes. Unlike conventional instructional design, AI-powered systems continuously analyze learner behavior, predict learning needs, recommend personalized instructional materials, and automate repetitive academic tasks. This enables faculty members to focus more on higher-order pedagogical activities such as mentoring, facilitating discussions, and developing critical thinking among students (Luckin et al., 2016).

The rapid advancement of generative AI, adaptive learning systems, and learning analytics has transformed instructional design into a dynamic, data-responsive process. AI algorithms can generate customized learning content, assess student performance in real time, and provide intelligent feedback that supports both instructors and learners. Such capabilities improve instructional efficiency while enhancing learning experiences through personalized pathways (Holmes et al., 2022).

From the perspective of educational innovation, AI-driven instructional design aligns with constructivist learning theory by enabling adaptive learning environments where instructional strategies evolve according to learners' cognitive progress. Faculty members who effectively integrate AI into instructional planning demonstrate greater instructional flexibility, improved classroom management, and more efficient resource utilization (Zawacki-Richter et al., 2019). Consequently, AI-driven instructional design has become a

strategic capability that supports academic excellence in higher education institutions undergoing digital transformation.

Data-informed decision making (DIDM) refers to the systematic use of educational data, analytics, and evidence to guide planning, instructional improvement, policy development, and organizational decision making. Rather than relying solely on intuition or experience, faculty members increasingly utilize data generated through learning management systems, student assessments, classroom engagement metrics, and institutional databases to improve educational effectiveness (Mandinach & Gummer, 2016).

The emergence of educational big data has significantly expanded opportunities for evidence-based teaching. Learning analytics platforms provide insights into student engagement, learning behaviors, risk prediction, and instructional effectiveness, allowing faculty members to make timely pedagogical interventions. These data-driven approaches enhance instructional quality by identifying learning difficulties early and recommending appropriate instructional modifications (Siemens & Long, 2011).

Within higher education institutions, data-informed decision making extends beyond classroom instruction to curriculum development, academic quality assurance, resource allocation, and institutional performance management. Faculty members who possess strong data literacy are better equipped to interpret educational evidence, evaluate instructional outcomes, and implement continuous improvements based on measurable indicators (Marsh, Pane, & Hamilton, 2006). Therefore, data-informed decision making has become an essential competency for educators operating in digitally enabled universities.

Faculty performance represents the extent to which academic staff successfully accomplish teaching, research, community service, and institutional responsibilities. In the digital education era, faculty performance is no longer evaluated solely by classroom teaching effectiveness but also by technological adaptability, digital pedagogy, research productivity, innovation capability, and contributions to institutional digital transformation (OECD, 2021).

Digital transformation has fundamentally reshaped academic work by requiring educators to integrate emerging technologies into curriculum design, online instruction, student assessment, and academic collaboration. Faculty members are expected to demonstrate digital competence, technological creativity, and continuous professional learning to remain effective in rapidly changing educational environments (Redecker, 2017).

The integration of AI-driven instructional design and data-informed decision making contributes significantly to faculty performance by improving instructional quality, enhancing decision accuracy, reducing administrative workload, and supporting evidence-based academic practices. According to the Resource-Based View (RBV), organizational capabilities such as digital competence, AI utilization, and analytical decision-making constitute valuable strategic resources that enhance individual and institutional performance (Barney, 1991). Consequently, faculty members who effectively leverage AI technologies and educational data are more likely to achieve superior teaching outcomes, greater research productivity, stronger student engagement, and sustained professional performance.

METHODS

Research Design

This study employed a qualitative research approach using an exploratory case study design to understand how faculty members enhance their performance through AI-driven instructional design and data-informed decision-making in the digital education era. A qualitative approach is appropriate because it seeks to explore participants' experiences, perceptions, beliefs, and practices within their real-life contexts rather than testing predetermined hypotheses (Creswell & Poth, 2018). The

case study design allows for an in-depth examination of complex educational phenomena by considering multiple sources of evidence and contextual factors that influence faculty performance (Yin, 2018).

The study was guided by an interpretivist paradigm, which assumes that reality is socially constructed through participants' lived experiences and interactions with digital technologies. This perspective enables the researcher to capture how faculty members interpret artificial intelligence, utilize educational data, and adapt their instructional practices within digitally transformed universities. The investigation focused on understanding the processes through which AI-supported instructional strategies and evidence-based decision-making contribute to teaching effectiveness, professional development, and academic performance.

Research Participants and Data Collection

Participants were selected using purposive sampling, ensuring that only faculty members with substantial experience in digital teaching and AI-supported instructional practices were included. Eligible participants had at least three years of teaching experience in higher education and had actively integrated artificial intelligence applications, learning management systems, learning analytics, or other digital technologies into their instructional activities. Sampling continued until data saturation was achieved, resulting in approximately 20–25 faculty members representing various academic disciplines and institutional backgrounds (Patton, 2015).

Data were collected through semi-structured, in-depth interviews lasting between 60 and 90 minutes. The interview protocol explored participants' experiences with AI-driven instructional design, the use of educational data for academic decision-making, perceived impacts on teaching performance, institutional support, implementation challenges, and future expectations. To enrich the findings and strengthen credibility, interview data were complemented by document analysis, including institutional policies, digital learning guidelines, faculty development programs, course materials, and instructional reports. Where possible, non-participant observations of online teaching sessions and digital learning environments were also conducted to obtain contextual evidence regarding instructional practices (Merriam & Tisdell, 2016).

Prior to data collection, ethical approval was obtained from the relevant institutional authority. Participants received detailed information regarding the purpose of the study, voluntary participation, confidentiality, anonymity, and their right to withdraw at any stage. Written informed consent was obtained before interviews commenced.

Data Analysis and Trustworthiness

The qualitative data were analyzed using thematic analysis following the six-phase framework proposed by Braun and Clarke (2006). The analysis began with repeated reading of interview transcripts to achieve familiarity with the data. Subsequently, meaningful data segments were systematically coded to identify recurring concepts related to AI implementation, instructional innovation, data utilization, and faculty performance.

The coded data were then organized into preliminary themes that reflected common patterns across participants' experiences. Themes were continuously reviewed, refined, and defined to ensure conceptual coherence and consistency with the research objectives. The final themes represented the major dimensions explaining

how faculty members utilize AI-driven instructional design and data-informed decision-making to improve their academic performance.

To enhance the trustworthiness of the findings, the study adopted the criteria proposed by Lincoln and Guba (1985). Credibility was strengthened through member checking, prolonged engagement, and triangulation of interviews, observations, and documents. Transferability was achieved by providing rich descriptions of the research context and participants. Dependability was ensured through maintaining an audit trail documenting each stage of data collection and analysis, while confirmability was supported through reflexive journaling and independent peer review of coding decisions. Qualitative data management and coding were supported using NVivo 14 to facilitate systematic organization and retrieval of textual data.

Research Quality and Ethical Considerations

Maintaining methodological rigor and ethical integrity was a central consideration throughout the research process. Ethical principles followed internationally recognized guidelines for research involving human participants, including respect for autonomy, confidentiality, beneficence, and informed consent (American Psychological Association, 2020).

To minimize researcher bias, reflexivity was practiced continuously throughout the study. The researcher maintained reflective field notes documenting assumptions, methodological decisions, and emerging interpretations during data collection and analysis. Peer debriefing sessions with experienced qualitative researchers were conducted to challenge interpretations and strengthen analytical rigor.

Data confidentiality was maintained by assigning pseudonyms to participants and removing all identifying information from interview transcripts and institutional documents. Digital files were securely stored using password-protected devices accessible only to the research team. The integration of ethical procedures, rigorous thematic analysis, and multiple validation strategies ensured that the findings accurately represented participants' experiences while maintaining high standards of qualitative research quality.

RESULTS

Faculty Members' Experiences of Implementing AI-Driven Instructional Design in Teaching Practices

The first research question sought to explore how faculty members experience the implementation of AI-driven instructional design in their teaching practices. The thematic analysis identified three interrelated themes: AI as a facilitator of instructional innovation, personalization of learning experiences, and the evolving role of faculty in AI-supported education.

Participants consistently described artificial intelligence as a valuable resource that transformed the way they planned, developed, and delivered instructional materials. Rather than replacing educators, AI was perceived as a tool that accelerated routine instructional tasks while allowing faculty members to devote greater attention to higher-order pedagogical activities.

Many participants explained that AI applications assisted them in generating lesson plans, preparing teaching materials, creating assessment questions, and organizing learning resources within a considerably shorter time. This increased efficiency enabled them to spend more time facilitating classroom discussions, mentoring students, and refining learning activities.

One participant stated:

"Before using AI, preparing one week's teaching materials could take several days. Now AI helps generate an initial framework within minutes, allowing me to focus on improving the quality of discussions and adapting the content to my students' needs." (Participant 5)

Similarly, another participant remarked:

"AI has become my teaching assistant rather than my replacement. It reduces repetitive work but still requires my judgment to ensure the materials are accurate and relevant." (Participant 11)

These narratives indicate that faculty members viewed AI primarily as an instrument for enhancing instructional productivity while maintaining human oversight over educational quality.

A second prominent theme concerned the ability of AI to support more personalized and student-centered learning. Participants reported using AI to design instructional materials with varying levels of complexity, generate multiple examples, recommend additional learning resources, and provide individualized feedback to students.

Faculty members observed that AI-enabled personalization encouraged greater student engagement because learning materials could be adapted to different learning abilities and interests. Several participants noted that students became more active during classroom discussions when instructional content reflected their academic needs.

One participant explained:

"Previously I prepared one learning module for everyone. Now I can easily modify explanations, examples, and exercises for students with different levels of understanding." (Participant 8)

Another participant added:

"AI allows me to respond more quickly to students' questions and provide additional references, making learning more interactive and responsive." (Participant 17)

These findings suggest that AI-driven instructional design supports more flexible instructional strategies that accommodate learner diversity while promoting inclusive educational practices.

Although participants acknowledged numerous advantages of AI, they unanimously emphasized that technology could not replace the pedagogical expertise, ethical judgment, and interpersonal relationships established by faculty members. Instead, AI was regarded as a collaborative partner that complemented professional competence.

Participants highlighted that critical evaluation remained essential because AI-generated content occasionally contained inaccuracies, outdated information, or contextually inappropriate recommendations. Consequently, faculty members considered themselves responsible for validating AI outputs before integrating them into teaching.

One participant noted:

"AI provides suggestions, but I am still responsible for deciding what is academically appropriate for my students." (Participant 2)

Another participant commented:

"Technology can generate information, but it cannot understand students' emotions, motivation, or classroom dynamics the way a lecturer can." (Participant 14)

These reflections demonstrate that faculty members perceived their professional role as shifting from being the primary source of knowledge toward becoming learning facilitators, instructional designers, and ethical decision-makers who strategically integrate AI into educational practice.

Across participants, AI-driven instructional design was consistently perceived as an enabler of pedagogical innovation rather than a substitute for faculty expertise. The findings indicate that faculty members experienced AI as enhancing instructional efficiency,

supporting personalized learning, and expanding opportunities for creative teaching. At the same time, they emphasized that successful AI integration depends on educators' professional judgment, digital competence, and ethical responsibility. Collectively, these experiences illustrate that faculty performance in the digital education era is increasingly characterized by the ability to combine technological capabilities with human-centered pedagogy, thereby redefining the role of faculty members within contemporary higher education.

Faculty Members' Utilization of Data-Informed Decision-Making to Support Instructional and Academic Activities

The second research question explored **how** faculty members utilize data-informed decision-making to support instructional and academic activities. The analysis revealed that participants increasingly relied on educational data as an integral component of their teaching practices and academic responsibilities. Rather than depending solely on personal experience or intuition, faculty members described using various forms of academic data to guide instructional planning, monitor student learning, evaluate teaching effectiveness, and support continuous improvement.

Participants explained that learning management systems (LMS), online assessment platforms, classroom attendance records, student participation logs, and learning analytics dashboards provided valuable information regarding students' learning behaviors and academic progress. These data enabled faculty members to identify students who required additional support, modify instructional strategies, and implement timely interventions. Several participants noted that the availability of real-time learning data enhanced their confidence in making instructional decisions because those decisions were supported by observable evidence rather than subjective judgment.

One participant explained:

"The learning analytics in our LMS show which students rarely access learning materials or fail to complete assignments on time. This information allows me to contact them earlier and adjust my teaching strategy before their performance declines." (Participant 7)

Another participant emphasized the importance of evidence-based instructional planning:

"I now review assessment data before planning the next lesson. If many students struggle with a particular concept, I redesign the learning activities instead of continuing with the original plan." (Participant 13)

Beyond classroom instruction, participants described using educational data to support broader academic responsibilities, including curriculum evaluation, course improvement, accreditation preparation, and departmental quality assurance. Student evaluation results, course completion rates, graduate outcomes, and institutional performance indicators were regularly analyzed to identify strengths and areas requiring improvement. Faculty members perceived these practices as contributing to a culture of continuous quality enhancement within their institutions.

Several participants also reported that educational data facilitated collaboration among colleagues. Department meetings increasingly involved discussions based on student performance reports, course evaluations, and institutional analytics, allowing faculty members to share experiences and collectively develop strategies for improving teaching quality.

As one participant stated:

"Academic discussions are now more objective because we examine actual learning data rather than relying only on personal opinions. This helps us reach better decisions as a department." (Participant 19)

Despite recognizing the benefits of data-informed decision-making, participants identified several challenges affecting its implementation. Many acknowledged that interpreting learning analytics required adequate data literacy and analytical competence, which varied considerably among faculty members. Some participants expressed uncertainty regarding the interpretation of complex dashboards or statistical reports, particularly when institutional training opportunities were limited.

In addition, participants highlighted concerns regarding data privacy, ethical use of student information, and institutional policies governing access to educational data. They emphasized that data should be used responsibly to support student development rather than to monitor or evaluate students in ways that could create unnecessary pressure or bias.

One participant remarked:

"Educational data are valuable, but they must be interpreted carefully. Numbers alone cannot fully explain why students perform in certain ways because every learner has different circumstances." (Participant 10)

Another participant added:

"Using data effectively requires both technical skills and ethical responsibility. Faculty members need clear institutional guidelines to ensure that student information is protected." (Participant 21)

Overall, participants viewed data-informed decision-making as an essential component of contemporary academic practice that strengthened instructional planning, enhanced responsiveness to student learning needs, and supported institutional quality improvement. However, they also emphasized that educational data should complement rather than replace professional judgment. The findings suggest that effective academic decision-making emerges from the integration of analytical evidence, pedagogical expertise, and contextual understanding, enabling faculty members to make more informed, reflective, and student-centered decisions in the digital education era.

How Faculty Members' Experiences Shape Faculty Performance in the Context of Digital Higher Education

The third research question explored how faculty members' experiences with AI-driven instructional design and data-informed decision-making shape faculty performance within the context of digital higher education. The findings indicate that faculty performance is no longer perceived solely in terms of teaching effectiveness or research productivity. Instead, participants described faculty performance as a multidimensional construct encompassing instructional innovation, digital competence, continuous professional learning, collaboration, adaptability, and ethical responsibility in the use of emerging technologies.

Participants consistently reported that their engagement with AI technologies and educational data had transformed their professional identities. Many explained that they had shifted from being traditional knowledge transmitters to facilitators of learning who design adaptive learning environments, encourage student engagement, and continuously refine instructional strategies based on feedback and learning evidence. This transformation was viewed as an ongoing process requiring continuous learning rather than a one-time technological adaptation.

One participant reflected:

"My role has changed significantly. Students can easily obtain information from AI, so my responsibility is no longer simply delivering knowledge but helping them interpret, evaluate, and apply that knowledge critically." (Participant 6)

Another participant emphasized:

"Digital technology has encouraged me to become a lifelong learner. Every semester I explore new AI tools, update my teaching strategies, and learn from both colleagues and students." (Participant 15)

Participants also described improvements in instructional confidence and professional satisfaction. They explained that AI-assisted lesson preparation and data-informed instructional planning reduced administrative burdens and enabled them to devote more attention to meaningful interactions with students. As a result, they perceived themselves as becoming more responsive to students' academic needs while simultaneously improving the overall quality of their teaching.

Several participants observed that these experiences extended beyond individual classrooms and contributed to broader institutional development. Faculty members increasingly collaborated in designing digital learning resources, sharing innovative teaching practices, and participating in institutional initiatives related to digital transformation. Such collaboration fostered a culture of continuous improvement in which professional learning became a collective rather than an individual responsibility.

One participant explained:

"Working with digital technologies has strengthened collaboration among lecturers. We frequently exchange AI prompts, teaching materials, and ideas about interpreting learning analytics, which benefits everyone." (Participant 9)

Despite these positive developments, participants emphasized that sustaining improved faculty performance depends on supportive institutional ecosystems. They highlighted the importance of continuous professional development, access to reliable digital infrastructure, institutional policies governing ethical AI use, and leadership commitment to educational innovation. Several participants noted that unequal technological resources and varying levels of digital competence among faculty members remained barriers to maximizing the benefits of AI and educational analytics.

One participant remarked:

"Technology alone cannot improve faculty performance. Universities must invest in training, provide technical support, and establish clear ethical guidelines so lecturers can confidently integrate AI into their professional practice." (Participant 18)

Participants further stressed that ethical considerations have become an increasingly important dimension of faculty performance. Responsible use of AI, transparency in AI-assisted teaching, protection of student data, and maintenance of academic integrity were repeatedly identified as essential professional obligations. Faculty members believed that technological competence should always be accompanied by ethical awareness to ensure that digital innovation supports, rather than compromises, educational quality.

Overall, the findings demonstrate that faculty performance in the digital education era is shaped through the dynamic interaction between technological capability, pedagogical expertise, reflective practice, and institutional support. Participants viewed AI-driven instructional design and data-informed decision-making not merely as technological innovations but as catalysts for professional transformation that encourage continuous learning, instructional creativity, collaborative practice, and ethical leadership. These experiences illustrate that effective faculty performance in digitally transformed higher education emerges from the ability to integrate human judgment, educational values, and technological resources into coherent and student-centered academic practices.

DISCUSSION

The findings of this study demonstrate that faculty performance in the digital education era is shaped through the dynamic integration of AI-driven instructional design, data-informed decision-making, and continuous professional adaptation. Rather than functioning as independent practices, these three dimensions collectively redefine the role of faculty members from traditional knowledge transmitters to reflective instructional designers, data-informed decision makers, and facilitators of student-centered learning. The participants' experiences indicate that artificial intelligence enhances instructional efficiency, educational data strengthen evidence-based pedagogical decisions, and the combination of these capabilities contributes to sustainable improvements in faculty performance.

The first finding revealed that AI-driven instructional design serves primarily as an enabler of instructional innovation rather than a substitute for educators. Participants consistently emphasized that AI supports lesson planning, content generation, assessment design, and personalized learning while leaving pedagogical judgment and ethical responsibility in the hands of faculty members. This finding aligns with Holmes et al. (2022), who argue that AI in education should be viewed as an augmentation technology that strengthens, rather than replaces, human expertise. Similarly, Luckin et al. (2016) suggest that intelligent educational systems are most effective when they complement educators' professional knowledge by automating routine tasks and providing adaptive instructional support. The participants' experiences further reinforce the systematic review conducted by Zawacki-Richter et al. (2019), which concluded that the greatest educational value of AI lies in supporting personalization, intelligent tutoring, and instructional assistance instead of replacing teachers. The present study extends these findings by demonstrating that faculty members perceive AI as a collaborative partner that enables greater creativity, responsiveness, and flexibility in instructional practice while preserving the central role of human pedagogical expertise.

The second finding highlights the increasing importance of data-informed decision-making in contemporary higher education. Participants described educational data as an essential resource for monitoring student engagement, evaluating learning outcomes, improving course design, and supporting institutional quality assurance. Rather than relying solely on intuition or previous teaching experience, faculty members increasingly integrated learning analytics and institutional data into instructional planning and academic decision-making. These findings support Siemens and Long (2011), who argue that learning analytics transform educational decision-making by providing timely and actionable evidence regarding student learning processes. Likewise, Mandinach and Gummer (2016) emphasize that data literacy has become a fundamental professional competency for educators because effective interpretation of educational evidence enables more responsive and informed instructional decisions. The participants' reflections also correspond with Marsh et al. (2006), who describe evidence-based educational decision-making as an essential mechanism for continuous instructional improvement. However, this study further reveals that faculty members regard educational data as complementary rather than deterministic. Participants consistently emphasized that quantitative indicators must be interpreted alongside contextual knowledge of students' learning conditions, suggesting that professional judgment remains indispensable even in increasingly data-rich educational environments.

The third finding demonstrates that sustained engagement with AI technologies and educational data contributes to a broader transformation of faculty performance. Participants no longer defined professional performance solely through teaching effectiveness or research productivity but also through continuous learning, digital competence, instructional innovation, collaborative practice, and ethical responsibility. These findings support

Redecker's (2017) Digital Competence Framework for Educators, which identifies technological integration, reflective practice, learner empowerment, and continuous professional development as central competencies for educators in digitally transformed learning environments. Similarly, the OECD (2021) argues that digital transformation requires educators to develop adaptive capabilities that combine technological proficiency with pedagogical innovation and ethical awareness. The participants' experiences indicate that digital competence is not merely a technical skill but a continuous process of professional learning through experimentation, collaboration, and reflective practice.

From a theoretical perspective, these findings provide additional support for the Resource-Based View (RBV). Barney (1991) argues that sustainable performance is achieved through valuable, rare, inimitable, and organizationally embedded resources. Within the context of higher education, AI literacy, instructional innovation, data literacy, analytical capability, and ethical decision-making emerge as strategic intangible resources that enhance faculty performance. Unlike physical technologies that can be acquired by multiple institutions, the ability of faculty members to integrate AI tools with pedagogical expertise and contextual understanding represents a distinctive organizational capability that is difficult to replicate. Consequently, faculty performance in digitally transformed universities depends less on the availability of technology itself than on educators' capability to transform technological resources into meaningful educational practices.

Another important contribution of this study concerns the evolving relationship between technology and human agency. Although participants acknowledged the efficiency and analytical capabilities of AI, they consistently rejected the notion that technology could replace faculty members. Instead, they described AI as a collaborative resource whose effectiveness depends upon human interpretation, ethical consideration, and pedagogical expertise. This finding resonates with current discussions on human-centered artificial intelligence, which emphasize that educational technologies should support human decision-making while preserving professional autonomy, critical thinking, and educational values (Holmes et al., 2022). The findings therefore suggest that successful digital transformation in higher education is achieved not through technological substitution but through productive collaboration between intelligent systems and human educators.

Overall, the three research findings collectively demonstrate that faculty performance enhancement is a multidimensional and socially constructed process. AI-driven instructional design strengthens instructional innovation, data-informed decision-making improves evidence-based academic practice, and continuous professional adaptation enables faculty members to integrate technological capabilities with pedagogical expertise and ethical responsibility. These findings contribute to qualitative research on digital higher education by illustrating how faculty members interpret, negotiate, and incorporate emerging technologies into their professional identities and everyday instructional practices. They further suggest that universities seeking sustainable digital transformation should prioritize faculty development, digital literacy, institutional support, and ethical governance alongside investments in educational technologies.

CONCLUSION

This study demonstrates that faculty members perceive AI-driven instructional design as a strategic resource that enhances instructional innovation, increases teaching efficiency, and enables more personalized learning experiences. Rather than replacing educators, artificial intelligence functions as a collaborative tool that supports instructional planning, content development, and assessment while preserving the essential role of faculty members in exercising pedagogical expertise, professional judgment, and ethical responsibility.

The findings further reveal that data-informed decision-making has become an integral component of academic practice in the digital education era. Faculty members increasingly utilize learning analytics, student performance data, and institutional information to guide instructional planning, monitor learning progress, and support evidence-based academic decisions. Participants emphasized that educational data enhance the quality of teaching and institutional improvement when interpreted alongside contextual understanding and professional experience.

Finally, the study concludes that faculty performance in digitally transformed higher education extends beyond traditional measures of teaching and research productivity. Faculty performance is increasingly characterized by continuous professional learning, digital competence, instructional adaptability, collaborative engagement, and responsible integration of artificial intelligence into educational practice. These findings highlight that successful digital transformation depends not only on technological infrastructure but also on institutional support that empowers faculty members to continuously develop their technological, pedagogical, and ethical capabilities.

Research Limitations

This study has several limitations that should be acknowledged. First, the findings are based on a qualitative case study involving a relatively limited number of faculty members; therefore, they are intended to provide an in-depth understanding of participants' experiences rather than statistical generalization. Second, the study focused primarily on faculty perspectives, without incorporating the views of students, academic administrators, or institutional leaders, which could provide a more comprehensive understanding of AI implementation in higher education. Third, because digital technologies and artificial intelligence continue to evolve rapidly, participants' experiences may change over time as institutions adopt new AI applications, educational policies, and digital learning ecosystems. Future studies may employ longitudinal qualitative research or comparative multi-institutional case studies to examine how faculty experiences evolve across different higher education contexts and technological environments.

Author Contributions

Rohmah conceived the research idea, developed the conceptual framework, supervised the overall research process, interpreted the findings, and led the preparation of the manuscript. Fitria designed the research methodology, conducted the interviews, coordinated data collection, and contributed to data analysis and manuscript drafting. Esih Sukaesih participated in thematic analysis, validated the coding process, interpreted the qualitative findings, and critically revised the manuscript. Dede Ibnu Romdoni contributed to document analysis, literature review, methodological validation, and manuscript editing to ensure academic rigor and coherence. Aubhan assisted in data organization, transcription verification, reference management, language editing, and final manuscript preparation. All authors reviewed, approved, and agreed to be accountable for the final version of the manuscript.

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Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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