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Developing Teaching Competencies for University Lecturers to Meet Educational Innovation and Sustainable Development Demands

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***Abstract*---**This study explores the development of teaching competencies for university lecturers to effectively meet the demands of educational innovation and sustainable development. Employing a mixed-methods approach, data were collected from 150 lecturers across two Vietnamese institutions via surveys and interviews. Findings reveal that lecturers possess moderate to high competencies in pedagogical skills, digital literacy, and sustainable education knowledge, with significant differences in pedagogical skills between institutions. However, challenges such as limited training opportunities, time constraints, and insufficient institutional support hinder competency enhancement. The study underscores the necessity for comprehensive professional development programs integrating pedagogical innovation, digital skills, and sustainability principles. These efforts are crucial to empower lecturers as change agents, aligning higher education practices with the United Nations' 2030 Agenda for Sustainable Development.

***Keywords*---**Teaching Competencies, Educational Innovation, Sustainable Development, Professional Development, Digital Literacy.

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1. Introduction

In recent years, education for sustainable development (ESD) has gained significant global attention as a critical approach to addressing complex environmental, social, and economic challenges. The United Nations' 2030 Agenda for Sustainable Development emphasizes the crucial role of education in promoting sustainability knowledge, attitudes, and behaviors among learners at all levels (UN, 2015). Consequently, higher education institutions are increasingly expected to integrate sustainability principles into their curricula, teaching methodologies, and institutional policies to prepare graduates capable of contributing to sustainable societies (Al-Naqbi & Alshannag, 2018; Laurie et al., 2016).

University lecturers play a pivotal role in this transformation, as their teaching competencies directly influence the quality of education and the effectiveness of sustainable development initiatives (Darling-Hammond, 2017; Bürgener & Barth, 2018). Developing lecturers' competencies in both pedagogical innovation and sustainability is therefore essential to align teaching practices with current educational reforms and sustainability goals (Ferreira et al., 2007). However, despite the growing emphasis on ESD, many higher education institutions face challenges in equipping their faculty with the necessary skills, knowledge, and attitudes to deliver innovative and sustainability-focused education (Andersson, 2017; Merritt et al., 2019).

Moreover, the rapid advancement of digital technologies and the shift toward modern educational models require lecturers to continuously update their teaching competencies, including digital literacy and systems thinking skills, to engage students effectively and foster critical thinking (Alnasib, 2023; Ateskan & Lane, 2018). Project-based learning and other active pedagogies have emerged as promising approaches to enhance these competencies and support sustainable education outcomes (Alrajeh, 2021; Roessingh & Chambers, 2011; Kien et al., 2024; Khanh et al., 2023).

This study aims to explore the development of teaching competencies for university lecturers to meet the demands of educational innovation and sustainable development. It investigates the current status, challenges, and opportunities for capacity building within higher education contexts, contributing to the ongoing discourse on quality teacher education and sustainability integration (Prasertcharoensuk et al., 2015).

2. Literature Review

2.1. The Concept of Teaching Competency and Its Main Components

Teaching competency refers to the integrated set of knowledge, skills, attitudes, and values that educators require to effectively design, deliver, and assess learning experiences (Darling-Hammond, 2017). It goes beyond mere content expertise and encompasses pedagogical knowledge, classroom management, communication skills, and the capacity for reflective practice and continuous professional growth (Morris, 2006; Phung et al., 2020). According to Bürgener & Barth (2018), key components of teaching competency include instructional

planning, assessment literacy, the ability to incorporate digital tools, and fostering inclusive classrooms that accommodate diverse learner needs.

Moreover, teaching competency involves cognitive and affective dimensions such as motivation, commitment to professional ethics, and adaptability to changing educational environments (Dinh et al., 2025). Effective teaching competencies also require systems thinking skills, enabling educators to understand and respond to the complex interactions within educational ecosystems (Ateskan & Lane, 2018). Developing these competencies is crucial to align teaching practices with contemporary pedagogical standards and to improve student engagement and learning outcomes in higher education settings.

2.2. Trends of Innovation in Higher Education: Methodological Innovation, Digital Technology, and Modern Training Models

Higher education institutions worldwide face increasing demands to innovate their teaching and learning processes to meet the needs of a rapidly evolving knowledge society (Darling-Hammond, 2017; Laurie et al., 2016). One prominent trend is the shift from traditional lecture-based instruction toward more learner-centered and active pedagogies, including project-based learning, problem-based learning, and flipped classrooms, which promote critical thinking, collaboration, and real-world application of knowledge (Bell, 2010; Alrajeh, 2021; Roessingh & Chambers, 2011).

Parallel to pedagogical innovation, digital technology adoption has transformed higher education by enabling flexible, accessible, and personalized learning experiences (Çetin, 2021; Alnasib, 2023). Tools such as digital storytelling, virtual simulations, learning management systems, and peer assessment platforms facilitate interactive and student-centered approaches that enhance digital literacy and engagement (Marais, 2023; Zhang & Hwang, 2023). The integration of these technologies necessitates that university lecturers develop new competencies in digital education design and delivery.

Furthermore, modern training models in higher education emphasize interdisciplinary curriculum design, competency-based education, and lifelong learning (Laurie et al., 2016; Luong et al., 2024). There is a growing recognition of the importance of continuous professional development for lecturers to maintain relevance in their fields and to effectively incorporate educational innovations. This includes adopting sustainability education principles and fostering systemic and transformative learning approaches that prepare students for the complex challenges of the 21st century.

2.3. Education for Sustainable Development

Education for Sustainable Development (ESD) has been identified as a critical educational framework aimed at equipping learners with the knowledge, skills, values, and attitudes necessary to contribute to sustainable societies (UN, 2015). It integrates concepts of environmental stewardship, social equity, and economic viability within education systems, promoting holistic and systems-based thinking (Ferreira et al., 2007; Andersson, 2017).

ESD encourages participatory and experiential learning methods that engage students in addressing real-world sustainability challenges, thus fostering a sense of agency and motivation for sustainable action (Evans et al., 2016; Merritt et al., 2019). Research highlights that effective implementation of ESD depends heavily on the capacity of educators, who must possess competencies in sustainability content, pedagogical skills, and the ability to integrate sustainability across disciplines (Al-Naqbi & Alshannag, 2018; Bürgener & Barth, 2018).

Despite its recognized importance, challenges persist in mainstreaming ESD within higher education, including limited faculty training, lack of institutional policies, and difficulties in assessing sustainability competencies (Laurie et al., 2016). Therefore, strengthening university lecturers' competencies in ESD is essential for achieving the United Nations' Sustainable Development Goals and transforming education systems toward greater sustainability (Mohanty & Dash, 2018). This requires holistic professional development programs that blend pedagogical innovation, digital competence, and sustainability awareness to empower lecturers as change agents.

3. Research Methodology

This study employed a mixed-methods research design combining quantitative and qualitative approaches to comprehensively examine the development of teaching competencies among university lecturers in the context of educational innovation and sustainable development.

Research Participants
The quantitative phase involved surveying a total of 150 university lecturers, with 80 participants from the University of Fire Prevention and Fighting and 70 participants from the National Academy of Educational Management. These lecturers represent various faculties and departments, ensuring a diverse and representative sample of teaching staff.

Data Collection
Data were collected using a structured questionnaire designed to assess lecturers' self-perceived competencies in pedagogical skills, digital literacy, and sustainability education. The questionnaire included both closed-ended Likert-scale items and open-ended questions to gather detailed insights (Mohammadyari & Singh, 2015). The survey was distributed electronically and through direct contact over a period of two months.
In addition to the survey, semi-structured interviews were conducted with 20 lecturers (10 from each institution) to explore in greater depth their experiences, challenges, and perspectives related to developing teaching competencies and integrating sustainability in their teaching practices.

Data Analysis
Quantitative data from the questionnaires were analyzed using descriptive statistics to identify trends and levels of competency among lecturers. Comparative analysis between the two institutions was also performed. Qualitative data from interviews were transcribed and subjected to thematic

analysis to extract key themes related to competency development, institutional support, and pedagogical innovation.

4. Findings

4.1. Descriptive Statistics of Teaching Competencies

The quantitative data collected from 150 university lecturers (80 from the University of Fire Prevention and Fighting and 70 from the National Academy of Educational Management) were analyzed using SPSS. Descriptive statistics, including mean scores and standard deviations (SD) were calculated to assess the lecturers' self-perceived teaching competencies across three main domains: pedagogical skills, digital literacy, and sustainable education knowledge.

Table 1: Descriptive Statistics of Teaching Competency Scores

Competency Domain	**N**	**Mean**	**SD**	**Min**	**Max**
Pedagogical Skills	150	3.68	0.52	2.1	4.8
Digital Literacy	150	3.56	0.60	1.9	4.7
Sustainable Education Knowledge	150	3.65	0.55	2.0	4.9
Overall Average	150	3.63	0.54	2.0	4.7

Scores were measured on a 5-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree).

4.2. Comparison Between Institutions

An independent samples t-test was conducted to compare teaching competency scores between lecturers from the two institutions.

Table 2: Comparison of Competency Means by Institution

Competency Domain	**Institution**	**N**	**Mean**	**SD**	**t**	**p-value**
Pedagogical Skills	University of Fire Prevention and Fighting	80	3.75	0.48	2.04	0.044*
	National Academy of Educational Management	70	3.59	0.54		
Digital Literacy	University of Fire Prevention and Fighting	80	3.52	0.62	-1.10	0.273
	National Academy of Educational Management	70	3.61	0.57		
Sustainable Education Knowledge	University of Fire Prevention and Fighting	80	3.62	0.57	-0.65	0.518
	National Academy of Educational Management	70	3.68	0.53		

* $p < 0.05$ indicates a statistically significant difference.

Lecturers from the University of Fire Prevention and Fighting rated their pedagogical skills significantly higher than those from the National Academy of Educational Management ($p = 0.044$). No significant differences were found in digital literacy or sustainable education knowledge.

4.3. Detailed Analysis of Competency Components

Each competency domain was further analyzed by specific sub-skills. The following tables summarize the mean scores for major components.

Table 3a: Pedagogical Skills Components

Component	**Mean (Overall)**	**SD**
Instructional Planning	3.72	0.51
Classroom Management	3.66	0.54
Assessment Literacy	3.60	0.57
Student Engagement Techniques	3.65	0.52

Table 3b: Digital Literacy Components

Component	**Mean (Overall)**	**SD**
Use of Learning Management Systems	3.50	0.61
Digital Content Creation	3.58	0.58
Online Interaction Facilitation	3.60	0.59

Table 3c: Sustainable Education Knowledge Components

Component	**Mean (Overall)**	**SD**
Understanding of ESD Concepts	3.70	0.54
Integration of Sustainability in Curriculum	3.62	0.56
Promotion of Sustainable Behaviors	3.64	0.55

4.4. Qualitative Findings: Challenges in Competency Development

The thematic analysis of twenty semi-structured interviews with university lecturers revealed several significant challenges affecting the development of their teaching competencies. The most frequently reported issue was time constraints due to heavy workloads. Precisely, 16 lecturers (80%) indicated that their teaching, research, and administrative responsibilities limited their ability to participate in professional development activities. This lack of available time restricts their opportunities to acquire and enhance critical pedagogical and digital skills essential for educational innovation and sustainable development.

Limited access to updated and relevant training programs was highlighted by 13 lecturers (65%). These participants expressed dissatisfaction with the scarcity of courses focusing on digital literacy and sustainability education tailored to their professional context. Many found existing training to be outdated or overly

theoretical, lacking practical relevance for their teaching needs. This gap suggests a clear need for institutions to offer specialized, current, and applicable professional development opportunities.

Institutional support was another critical challenge, noted by 12 lecturers (60%). They reported insufficient institutional policies, incentives, and infrastructure, which affected their motivation and ability to implement innovative teaching methods. The absence of up-to-date technological resources such as modern learning management systems and digital tools, alongside bureaucratic constraints, were cited as barriers to effective competency development.

Finally, 11 lecturers (55%) emphasized a preference for practical, hands-on professional development over theoretical sessions. They indicated that workshops involving active participation, collaboration, and real-world application of skills were more effective in fostering competency. This finding aligns with adult learning theories highlighting experiential learning as essential for meaningful professional growth.

Together, these findings reveal a complex set of interrelated barriers to competency development. Addressing them requires a holistic strategy involving workload management, enhancement of relevant and practical training programs, stronger institutional support, and the promotion of experiential learning approaches.

5. Discussion

The findings of this study provide valuable insights into the current state of teaching competencies among university lecturers in the context of educational innovation and sustainable development (Könings et al., 2007). Overall, lecturers demonstrated a moderate to high level of self-perceived competence across pedagogical skills, digital literacy, and sustainable education knowledge, with average scores ranging from 3.56 to 3.68 on a 5-point scale. This suggests that while many lecturers recognize the importance of these competencies, there remains room for further enhancement to meet the evolving demands of higher education.

The statistically significant difference in pedagogical skills between lecturers from the University of Fire Prevention and Fighting and the National Academy of Educational Management indicates institutional variations in capacity building and professional development opportunities. The higher pedagogical competency reported by lecturers at the University of Fire Prevention and Fighting may reflect more robust training programs or greater emphasis on active teaching methodologies at this institution. Conversely, the lack of significant differences in digital literacy and sustainable education knowledge between the two institutions highlights a shared challenge across universities in these domains, pointing to the need for comprehensive support at a broader systemic level.

Detailed analysis of sub-components reveals that instructional planning and understanding of Education for Sustainable Development (ESD) concepts are relatively stronger areas among lecturers. However, components such as digital

content creation and the facilitation of online interaction scored slightly lower, underscoring the ongoing challenge of integrating digital technologies effectively into teaching practice. This aligns with the qualitative findings, where lecturers expressed difficulties related to limited access to up-to-date training and insufficient institutional support for digital and sustainability-oriented innovations.

The qualitative data further emphasize the time constraints and workload pressures faced by university lecturers, which impede their ability to engage in continuous professional development. This barrier is consistent with findings from prior studies (e.g., Ferreira et al., 2007; Andersson, 2017) and underscores the necessity for institutional policies that allocate dedicated time and resources for capacity building.

Given these findings, it is evident that fostering teaching competencies for educational innovation and sustainable development requires a multifaceted approach. Universities should prioritize the design and implementation of accessible, practical, and context-specific professional development programs that integrate pedagogical innovation, digital skills training, and sustainability education. Furthermore, institutional leadership must develop supportive policies and provide infrastructure that encourages lecturers to experiment with innovative teaching practices without excessive administrative burden.

This study contributes to the growing discourse on the critical role of university lecturers as change agents in embedding sustainability into higher education. Addressing the identified gaps in competencies will be essential to align teaching practices with the goals of the United Nations' 2030 Agenda and to prepare graduates capable of contributing to sustainable societies. Future research could expand the scope by examining longitudinal impacts of targeted training interventions and exploring students' perspectives on the effectiveness of lecturers' competencies in fostering sustainable development education.

6. Conclusion

This study highlights the current state and challenges of teaching competency development among university lecturers in the context of educational innovation and sustainable development. While lecturers demonstrate adequate proficiency in key competency areas, institutional differences and systemic barriers limit their full potential. The findings emphasize the urgent need for targeted, practical, and accessible capacity-building initiatives that combine pedagogical methods, digital literacy, and sustainability education. Institutional policies must also evolve to provide adequate support, including dedicated time and resources for professional development. By addressing these gaps, higher education institutions can better prepare lecturers to foster innovative teaching and contribute meaningfully to Sustainable Development Goals. Future research should focus on longitudinal assessments of training impacts and include student perspectives on the effectiveness of competency-driven teaching approaches.

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