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ONLINE TEACHING SKILLS OF PROFESSORS FOR SUSTAINABLE DELIVERY OF QUALITY EDUCATION

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ABSTRACT

The transition importance of online teaching skills among university professors. This paper examines the self-perceived online teaching competencies of **300 professors from various disciplines across universities in Chennai**. Using a structured self-assessment tool, the researchers analysed competencies across seven domains such as **Technological Proficiency, Digital Content Design & Delivery, Online Pedagogical Strategies, Student Engagement & Interaction, Assessment & Feedback, Professional Development & Ethics**. Demographic variables such as **teaching experience, academic discipline, and prior training in online teaching** are examined to understand toward digital instruction in higher education has highlighted the critical their impact on perceived competence. The questionnaire was distributed online through Google Forms, institutional LMS, and responses were collected over a two-week period. Informed consent was obtained from all participants. The findings indicate significant differences in skill levels based on prior training and discipline, with professors in technology-related fields reporting higher confidence in digital tools. **One-way ANOVA and independent t-tests** confirm that training plays a pivotal role in boosting faculty readiness for digital instruction. The study provides evidence-based recommendations for targeted faculty development programs and highlights the need for continuous professional learning to ensure quality in online education. This study supports institutional initiatives to increase enhance digital literacy, pedagogical effectiveness, and the **sustainable delivery of quality education** through digital transformation.

KEYWORDS: Digital Pedagogy, Online Teaching Skills, Professional Development, Sustainable Digital Learning. Quality Education.

INTRODUCTION

The landscape of higher education has undergone a profound transformation with the advent and widespread adoption of online teaching and learning. The integration of digital technologies has not only changed instructional delivery methods but has also redefined the essential competencies required of university professors. What was once considered supplementary—digital literacy and online pedagogy—has now become central to effective teaching in today's academic environment.

The transition to online platforms, especially post-COVID-19, has brought new challenges for educators. Professors are now expected to design engaging virtual lessons, utilize multimedia tools, manage virtual classrooms, and assess student performance through digital interfaces. However, the **effectiveness of online teaching is largely dependent on the instructor's skill set**, confidence, and ability to adapt to technology-mediated environments.

Several studies have pointed out disparities in online teaching competence, often influenced by factors such as **discipline of teaching, length of teaching experience, and whether the educator has received prior training in digital pedagogy**. For instance, faculty from humanities or education may approach online interaction differently than those from science or commerce, due to the nature of content and pedagogical demands. Similarly, those with more teaching experience may either excel due to familiarity with instructional strategies or lag due to resistance to technological change.

In light of these dynamics, it becomes crucial to explore how university professors perceive their own online teaching skills and how these skills vary across **demographic variables**. Such an investigation can inform the development of more targeted and effective **faculty development programs** and contribute to institutional efforts toward achieving **quality education through sustainable digital transformation**.

This study, therefore, aims to assess the online teaching skills of professors using a structured self-assessment tool and to analyze how these skills are influenced by **teaching experience, academic discipline, and prior training in online instruction**.

Need for the study

The rapid integration of digital technologies in higher education, especially accelerated by the COVID-19 pandemic, has redefined the role of university professors from traditional

knowledge transmitters to dynamic facilitators of online learning. This transformation has necessitated the development of a specific set of **online teaching skills**—including digital proficiency, pedagogical adaptability, virtual communication, and online assessment strategies.

Despite the increased emphasis on online and blended learning, research indicates that **many faculty members struggle with effective technology integration** due to gaps in training, lack of confidence, and variation in institutional support. Furthermore, studies have shown that **factors such as prior training, teaching experience, and subject discipline** significantly influence how professors adapt to and perform in online teaching environments. In this context, assessing and understanding the **current level of online teaching competencies among professors** becomes vital—not only for individual professional development but also for **institutional planning, faculty training programs, and policy formulation** aimed at promoting quality digital education.

Moreover, there is a noticeable lack of Indian-based studies that:

- Use a structured and validated **self-assessment tool** to measure online teaching skills,
- Compare skills across **academic disciplines**, and
- Examine the impact of **prior digital training and years of teaching experience** on online teaching effectiveness.

Thus, this study is **timely and relevant**, as it addresses a critical gap in educational research and provides empirical evidence to support capacity-building initiatives in higher education. It will help academic leaders and policymakers in designing **targeted faculty development programs**, fostering digital confidence, and ultimately enhancing **teaching-learning quality in virtual and blended ecosystems**.

Review Literature

A recent meta-analysis across Europe and Latin America involving 7,470 university lecturers revealed **moderate to low self-perceived digital competence** (effect size $r = -0.21$) Liesa-Orus, M., Lozano Blasco, R., & Arce-Romeral, L. (2023). Notably, the **discipline or academic area** significantly influenced competence levels, supporting the importance of the "discipline" demographic variables. A global systematic review of teachers' digital competence (2000–2021) identified a common finding that **university educators often rate their digital competence at low or medium-low levels**, and highlight gaps in areas like

evaluation and pedagogy-related use of technology (veronica Basilotta-Gomez-pablos, Maria Matarranz 2022). Simşek et al. (2021) developed a validated **Online Teaching Competency Scale** for instructors in Turkey, identifying **four core competency factors**: Pedagogy, Facilitation, Technology, and Course Administration. The 15-item scale showed robust reliability ($\alpha = 0.83$). A systematic review (11 years; 43 studies) identified **eight major competency categories** in higher ed: among them, *planning/design/organization*, *interaction*, and *assessment* emerged as essential domains. These align closely with the current 7-domain scale structure Khodabandelou, R., Chaharbashloo, H., Ghaderi, M., Zeinabadi, H., & Karimi, L. (2022).

Sample

The sample consist of 300 university and college professors in Chennai, actively engaged in online teaching during the past academic year from various disciplines, selected through **stratified random sampling** to ensure representation from different teaching experience levels, academic disciplines, and training backgrounds.

METHODOLOGY

The study follows a **quantitative descriptive research design** with an inferential approach to examine the influence of demographic variables on the online teaching skills of university professors. The data was collected using a structured self-assessment scale . “**Online Teaching Skills Self-Assessment Scale for Professors** ” developed by the researchers. It consists of seven key dimensions with twenty one indicators rated on a 5-point Likert scale (1 = Not yet developed, 5 = Expert). Content validation was carried out by experts in Educational Technology and Teacher Education. **Reliability was found to be 0.8 using Cronbach’s Alpha**. The questionnaire was distributed online through mail, Google Forms, institutional LMS and responses were collected over a two-week period. Informed consent was obtained from all participants. Data were analyzed using **SPSS**. Participation was voluntary and no personal identifiers were collected.

Technological Proficiency

Technological proficiency refers to a professor’s ability to effectively utilize digital tools and platforms essential for delivering instruction in online or blended learning environments. In the context of higher education, this skill is foundational for ensuring smooth instructional delivery and fostering student engagement in virtual classrooms. Professors with strong technological proficiency are adept at navigating Learning Management Systems (LMS) such

as Moodle, Google Classroom, or Canvas to manage course materials, assignments, and assessments.

Moreover, the ability to conduct virtual classes using platforms like Zoom, Microsoft Teams, or Google Meet is a crucial component of this skill. It includes managing features such as screen sharing, breakout rooms, polls, and chat functions to maintain interaction and engagement during live sessions. The integration of multimedia resources—such as videos, digital presentations, podcasts, and interactive tools—not only enriches the learning experience but also caters to diverse learning styles.

Another important dimension of technological proficiency is digital resource curation. Professors must be capable of sourcing, organizing, and sharing relevant digital materials (e.g., eBooks, academic articles, instructional links, and PDFs) aligned with learning objectives and course outcomes. Finally, basic troubleshooting abilities—such as resolving connectivity issues, software malfunctions, or device compatibility problems—are essential for minimizing disruptions during online teaching. Technological proficiency encompasses both the operational and pedagogical use of technology. It is a core competency that determines a professor's effectiveness in the online teaching-learning process. Research highlights that faculty who possess higher levels of digital fluency are better positioned to create meaningful, interactive, and learner-centered online experiences (Martin et al., 2019; Kebritchi et al., 2017).

Digital Content Design & Delivery

Digital content design and delivery refers to a professor's ability to plan, create, and disseminate instructional materials in ways that are engaging, inclusive, and accessible to diverse learners in online environments. This skill involves thoughtful integration of visual, auditory, and interactive elements to enhance comprehension, maintain learner attention, and support varied learning needs.

Effective online educators use a variety of visual aids—such as infographics, diagrams, and animations—to simplify complex ideas and foster deeper understanding. The inclusion of interactive content (e.g., embedded quizzes, clickable learning modules, or real-time polls) further supports active learning and continuous engagement.

Another critical component is the creation of **pre-recorded lecture videos**, which allow students to access material at their own pace. These asynchronous resources, when well-structured, can support flexible learning and reinforce core concepts. An emerging best practice in this area is the **chunking of content** into microlearning segments—short, focused

units that improve retention and reduce cognitive overload, especially in virtual learning scenarios.

Additionally, effective digital design includes strategies for **adaptive and personalized learning**, such as varying the difficulty level of resources, embedding self-check questions, or offering differentiated materials based on students' progress or background knowledge. The use of **subtitles, screen reader compatibility, and other accessibility tools** ensures inclusivity, particularly for learners with visual, auditory, or cognitive challenges.

Digital content design and delivery represent a pedagogical shift toward learner-centered approaches in online education. As research by Mayer (2017) and Guo, Kim, and Rubin (2014) suggests, well-designed digital content significantly enhances learner engagement and improves academic outcomes, making this skill vital for faculty operating in virtual environments.

Online Pedagogical Strategies

Online pedagogical strategies refer to the deliberate use of teaching methods that are specifically adapted to virtual or blended learning environments. As online education continues to evolve, educators are required to move beyond traditional lecture-based delivery and adopt more learner-centered, participatory approaches that align with the digital medium. One widely adopted method is the **flipped classroom approach**, where instructional content is delivered asynchronously—typically through videos or readings—while synchronous class time is reserved for deeper discussion, clarification, or problem-solving. This model promotes active engagement and better assimilation of knowledge, allowing students to prepare beforehand and interact meaningfully during live sessions.

Another key strategy is the implementation of **blended learning models**, which integrate online tools with face-to-face or synchronous instruction. These models provide flexibility while maintaining structure and human connection, and they are particularly effective in catering to different learning paces and styles.

Inquiry-based and project-based learning are also highly effective in the online context, encouraging students to take ownership of their learning through exploration, research, and real-world application of knowledge. These strategies foster critical thinking, collaboration, and creativity, essential skills in 21st-century education.

To facilitate interaction and collaboration, professors often utilize **breakout rooms, discussion boards, or online forums**. These tools help replicate peer-to-peer learning and

group activities in a virtual setting, enhancing student engagement and reducing feelings of isolation.

Additionally, **gamification**—the use of game elements in learning—has gained popularity in online teaching. Tools like Kahoot, Quizizz, and Edmodo quizzes introduce competitive and playful elements into lessons, increasing motivation and reinforcing content through instant feedback.

The integration of these pedagogical strategies not only enhances student engagement and retention but also aligns with the constructivist paradigm of learning, where students actively construct knowledge. Research (e.g., Boettcher & Conrad, 2016; Hrastinski, 2019) affirms that employing diverse and interactive teaching methods significantly improves the efficacy of online instruction.

Engagement & Interaction

Student engagement and interaction are central to effective online teaching, as they directly influence learner motivation, knowledge retention, and overall academic success. In virtual environments, where physical presence is absent, professors must adopt intentional strategies to build an interactive and supportive learning atmosphere.

One critical aspect is **prompt communication and timely feedback**. Whether through email, chat, or LMS announcements, consistent responsiveness from instructors helps students feel supported and fosters a sense of accountability. Similarly, providing constructive feedback on assignments and participation sustains motivation and guides student progress.

Interactive tools such as **polls, quizzes, live chats, and reaction icons** can be strategically used during synchronous sessions to encourage real-time participation and gauge understanding. These methods also help to break the monotony of passive listening and keep students actively involved throughout the session.

Encouraging **peer learning through group discussions, collaborative projects, and breakout room activities** is another effective way to strengthen engagement. Such opportunities promote social learning, enhance communication skills, and create a sense of community among learners, which is often missing in online formats.

Professors also play a key role in **building virtual rapport and online presence**. This involves showing enthusiasm, using students' names, sharing relatable experiences, and being visible through video and voice. A strong online presence helps humanize the virtual classroom and makes the professor more approachable.

Lastly, regular **checking on student well-being and participation**, especially in extended online courses, is essential. This can be done through short surveys, informal check-ins, or reflective prompts. Monitoring engagement levels helps identify at-risk students and allows timely intervention to support their academic and emotional needs.

Research indicates that high levels of student interaction significantly correlate with better learning outcomes and satisfaction in online education (Dixson, 2015; Martin & Bolliger, 2018). Hence, developing student engagement strategies is indispensable for professors striving to create dynamic and inclusive virtual learning environments.

Assessment & Feedback

Assessment and feedback in online teaching are critical components that determine the effectiveness of instruction and support students' academic growth. In virtual learning environments, the challenge lies in developing fair, secure, and meaningful evaluation systems that measure both cognitive understanding and higher-order thinking skills.

One foundational aspect is the **design of online tests** that include a balance of objective (e.g., multiple choice, matching, true/false) and subjective (e.g., short answer, essay) items. These should align with course objectives and encourage application and analysis rather than rote memorization.

Professors are increasingly incorporating **open-book and timed assessments**, which focus more on conceptual clarity and critical thinking. These formats promote authentic learning and reduce opportunities for academic dishonesty, particularly when coupled with randomized question banks and time constraints.

To uphold academic integrity, the **use of plagiarism detection tools** (e.g., Turnitin, Grammarly, Urkund) has become a norm in evaluating written submissions. These platforms assist faculty in maintaining ethical standards while educating students about originality and citation norms.

Formative assessment techniques, such as exit tickets, one-minute papers, and reflection logs, offer continuous insights into student understanding and engagement. These low-stakes evaluations allow for real-time instructional adjustments and personalized support.

Furthermore, **automated grading and feedback tools**, integrated into most LMS platforms, streamline the assessment process. Features such as instant scoring, rubric-based evaluation, and comment banks enhance the consistency and timeliness of feedback, improving student learning outcomes.

According to literature (Gikandi, Morrow & Davis, 2011; Nicol, 2010), well-designed online assessments coupled with timely, constructive feedback contribute significantly to student motivation and achievement. Hence, assessment and feedback practices must be continuously innovated and aligned with pedagogical goals to ensure fairness, clarity, and student-centered learning in digital classrooms.

Classroom Management in Virtual Mode

Classroom management in virtual settings refers to the structured orchestration of learning environments to ensure discipline, engagement, and smooth instructional flow. Unlike physical classrooms, where non-verbal cues and proximity play a vital role in maintaining order, the online mode demands a distinct set of strategies to foster an organized and respectful learning atmosphere.

An essential first step is **setting clear ground rules for participation** at the beginning of a course or session. Guidelines regarding punctuality, camera usage, microphone etiquette, and respectful interaction help set expectations and prevent disruptions. These norms, when co-created with students, can promote a collaborative and self-regulated learning culture.

Professors must also be adept at **managing large groups using platform-specific control tools**, such as muting participants, enabling the “raise hand” feature, controlling chat permissions, and assigning co-host roles. These tools are critical in minimizing distractions and ensuring that discussions remain orderly and on-topic.

When disruptions do occur—such as unmuted background noise, inappropriate messages in chat, or technological misuse—**professional handling is key**. Instructors should address issues calmly and privately when possible, preserving the dignity of the student while maintaining classroom decorum.

Effective **time management during live sessions** is another vital component of virtual classroom control. Allocating time for lectures, discussions, Q&A, and student engagement activities ensures that sessions remain structured and purposeful. Utilizing timers, agendas, and segmenting content into clear stages can support both teacher and learner focus.

Research by Borup, West, & Graham (2012) emphasizes that effective online classroom management positively correlates with student satisfaction, attention, and learning outcomes. Therefore, mastering these digital strategies is essential for faculty to create a safe, respectful, and productive online learning environment.

Professional Development & Digital Ethics

In the rapidly evolving landscape of digital education, **professional development and digital ethics** have emerged as essential competencies for professors engaged in online teaching. This domain highlights the educator's responsibility to stay current with technological advancements while upholding ethical standards in virtual learning environments.

One of the core aspects of this competency is a **commitment to continuous learning**. Faculty members are expected to actively participate in **webinars, Massive Open Online Courses (MOOCs), and Faculty Development Programmes (FDPs)** that focus on educational technology, instructional design, and online pedagogy. These learning avenues equip educators with the latest tools and best practices for enhancing digital instruction.

Equally important is the practice of **academic integrity and copyright awareness**. Professors must model and teach proper citation practices, respect intellectual property, and avoid the use of unauthorized content. Ethical content creation and dissemination form the foundation of a credible academic environment.

Further, educators are responsible for **promoting safe and respectful digital behavior** among students. This includes cultivating a culture of inclusivity, respectful communication, and digital citizenship in virtual classrooms. Addressing issues such as cyberbullying, online harassment, and inappropriate sharing of materials is an integral part of this ethical commitment.

Finally, adherence to **data privacy and e-safety guidelines** is crucial. Professors must ensure the secure handling of student data, respect confidentiality, and follow institutional or governmental protocols regarding online platforms and digital tools. Awareness of global data protection regulations (such as GDPR or India's Data Protection Act) is increasingly relevant in international and cross-border education contexts.

As pointed out by scholars such as Ribble (2011) and Veletsianos (2016), integrating professional development with ethical awareness not only enhances instructional quality but also builds trust and credibility in the online learning ecosystem. Thus, this domain underpins a responsible and future-ready approach to online education.

Objectives

- 1.To assess the level of online teaching skills among university professors with respect to Teaching Experience, Academic Discipline, Prior Training in Online Teaching of professors.
- 2.To examine the relationship between online teaching skills and Teaching Experience, Academic Discipline, Prior Training in Online Teaching of professors.

3.To identify whether Teaching Experience, Discipline, prior training influences the development of online teaching competencies.

Hypotheses

1. There is no significant difference in online teaching skills among professors with different levels of teaching experience.
2. There is no significant difference in online teaching skills of professors across different academic disciplines.
3. There is no significant difference in online teaching skills of professors who has prior training in online teaching.
4. There is no significant relationship between online teaching skills and Teaching Experience, Academic Discipline, Prior Training in Online Teaching of professors.
5. Teaching Experience, Academic Discipline, Prior Training in Online Teaching of professors are not significant enough to predict online teaching skills among professors

Table 1: There is no significant difference in online teaching skills among professors with different levels of teaching experience.

Experience Group (Years)	n	Mean Score	SD	Significant Difference
0–5	60	3.45	0.60	Lower than 6–15 yrs
6–10	70	4.01	0.55	Higher than 0–5 yrs
11–15	65	4.05	0.50	Higher than 0–5 yrs
16–20	55	3.88	0.59	Not significant
21+	50	3.74	0.62	Not significant

One-way ANOVA was used to test the results and found to be $F(4, 295) = 3.67$, $p = .006$, $\eta^2 = .048$ - Professors with 6–10 and 11–15 years showed significantly higher online teaching skills than those with 0–5 years ($p < .05$). No significant difference was found between 16–20 and 21+ years, but both showed a slight decline compared to mid-career groups.

Interpretation

Professors with moderate experience (6–15 years) were more proficient, possibly due to a balance of pedagogical maturity and openness to technology. Early-career and very senior faculty showed lower scores.

Table 2: There is no significant difference in online teaching skills of professors across different academic disciplines.

Discipline	n	Mean Score	SD	Significant Difference
Humanities	60	3.52	0.60	Lower than Sci/Edu/Engg
Science	65	4.08	0.54	Higher than Humanities
Commerce & Mgmt	60	3.85	0.58	Moderate
Education	65	4.10	0.56	Higher than Humanities
Engineering	50	4.15	0.57	Higher than Humanities

One-way ANOVA was used to test the results and found to be $F(4, 295) = 5.43$, $p < .001$, $\eta^2 = .068$. Science, Education, and Engineering faculty scored significantly higher than Humanities ($p < .01$). Commerce faculty showed moderate competence, not significantly different from Science or Humanities.

Interpretation: Disciplines that are more technologically intensive (e.g., Engineering and Science) showed higher online teaching skills. Humanities faculty showed the lowest scores, possibly due to lesser exposure to or need for digital tools in their pedagogy.

Table 3: Professors who have received prior training in online teaching do not differ significantly in online teaching skills compared to those who have not.

Training Status	N	Mean Score	SD	Significant Difference
Trained	160	4.12	0.58	Significantly higher
Not Trained	140	3.66	0.62	Lower

Independent samples t-test were performed and found to be $t(298) = 6.12$, $p < .001$, Cohen's $d = 0.71$. **Interpretation:** Professors with prior training demonstrated significantly higher online teaching skills. Training contributes positively to perceived digital competency. Berge (2008) and later scholars discuss the **technological role of the online instructor**, noting that effective online teaching demands **transparent and seamless tech integration**, combined with pedagogical design skills.

Table 4: There is no significant relationship between online teaching skills and Teaching Experience, Academic Discipline, Prior Training in Online Teaching of professors.

Variable	Online Teaching Skills	Teaching Experience	Academic Discipline	Prior Learning
Online Teaching Skills	1.00			
Teaching Experience	.18**	1.00		

Academic Discipline	.21**	.09	1.00	
Prior Training in Online Teaching	.37***	.12*	.15**	1.00

** $p < .05$, ** $p < .01$, *** $p < .001$

To test this hypothesis, **Pearson's correlation analysis** and **Chi-square tests** were conducted.

Teaching Experience and Online Teaching Skills

A weak positive correlation was found ($r = 0.18$, $p < 0.01$), indicating that professors with more years of teaching experience tend to demonstrate slightly higher online teaching skills.

Academic Discipline and Online Teaching Skills

A Chi-square test showed significant differences across disciplines ($\chi^2 (4, N = 300) = 22.35$, $p < 0.01$), with professors from Science and Engineering reporting higher online teaching competency scores compared to those from Humanities.

Prior Training in Online Teaching and Online Teaching Skills

An independent-samples t -test revealed a significant difference between trained ($M = 4.12$, $SD = 0.48$) and untrained professors ($M = 3.68$, $SD = 0.52$); $t(298) = 7.14$, $p < 0.001$.

Therefore, **Hypothesis 4 is rejected**. There is a statistically significant relationship between online teaching skills and the demographic factors considered.

Interpretation: Online teaching skills are positively correlated with teaching experience, academic discipline, and prior training, with the strongest association found for prior training.

Table 5: Teaching Experience, Academic Discipline, and Prior Training in Online Teaching of professors are not significant enough to predict online teaching skills among professors.

Predictor variable	β (Beta)	t-value	p-value
Teaching Experience	.15	3.12	.002**
Academic Discipline	.18	3.56	<.001***
Prior Training in Online Teaching	.35	7.24	<.001***

** $p < .01$, *** $p < .001$

$$R = .46, R^2 = .21, \text{Adj. } R^2 = .20$$

$$F(3, 296) = 26.37, p < .001$$

A **multiple regression analysis** was conducted with online teaching skills as the dependent variable, and teaching experience, academic discipline, and prior training as predictors.

$$R = 0.46, R^2 = 0.21, \text{Adjusted } R^2 = 0.20, F(3, 296) = 26.37, p < 0.001$$

→ The model explains **21% of the variance** in online teaching skills.

Predictor-wise Contribution

Teaching Experience: $\beta = 0.15, p < 0.01$

Academic Discipline: $\beta = 0.18, p < 0.01$

Prior Training in Online Teaching: $\beta = 0.35, p < 0.001$

The regression results indicate that **all three variables significantly predict online teaching skills**, with **prior training** emerging as the strongest predictor.

Thus, **Hypothesis 5 is rejected**.

Interpretation: Teaching experience, academic discipline, and prior training are significant predictors of online teaching skills, explaining 21% of the variance. **Prior training is the strongest predictor.**

DISCUSSION

The present study explored the online teaching skills of 300 professors from various disciplines in Chennai, focusing on differences based on teaching experience, prior training in online teaching, and academic discipline. The findings reveals there is a statistically significant relationship between online teaching skills and the demographic factors considered.. That Online teaching skills are positively correlated with teaching experience, academic discipline, and prior training, with the strongest association found for prior training.

1. Teaching Experience and Online Teaching Skills

The results of the one-way ANOVA indicate a statistically significant difference in online teaching skills across teaching experience groups ($F(4, 295) = 3.67, p = .006$). Professors with 6–15 years of experience demonstrated the highest competency in online teaching. This mid-career group likely benefits from a blend of pedagogical maturity and openness to technological innovation. In contrast, early-career professors (0–5 years) showed lower proficiency, potentially due to limited exposure to hands-on teaching environments before transitioning to online platforms. Interestingly, those with over 20 years of experience also showed relatively lower digital competence, which may reflect resistance to technological

adaptation or lack of training. The ability to handle disruptions and technical issues is raised as key; this reinforces the instrument's focus on technical skills **Dennen, V.P., Jones, M.K. (2022)**. Literature emphasizes **active learning, instructional scaffolding, and cognitive apprenticeship techniques**—all of which frame student engagement strategies in online learning environments.

2. Academic Discipline and Online Teaching Skills

Significant disciplinary differences were also identified ($F(4, 295) = 5.43, p < .001$). Faculty from Engineering, Science, and Education demonstrated the highest levels of online teaching skills. This trend reflects the greater integration of technology and digital tools in these disciplines, both in content delivery and pedagogical style. Conversely, professors in Humanities showed the lowest scores, possibly due to the traditionally lecture-based nature of instruction and limited emphasis on tech-based interaction in their teaching methods. This variation highlights the need for discipline-sensitive training models that align with the pedagogical demands and digital readiness of each subject area. Encouraging interdisciplinary exposure to educational technology may also help balance these disparities. Research from Ecuador indicates that university faculty generally report **intermediate-level digital competence** (~65%), and **prior training in digital skills** significantly correlates with higher competence levels (χ^2 significant, $p < 0.05$). Jorge-Vázquez et al. 2021. This finding validates the hypothesis related with **Prior Training** to skills.

The inclusion of **Technological Proficiency** and **Pedagogy** domains supports with the study A structural equation modeling study in Malaysia found that components like *technology literacy, knowledge deepening, presentation skills, and professional skills* significantly influenced task-technology fit and, in turn, teaching effectiveness with Moodle platforms (A.M. Hiza, H Akhar Sentosa, W.Ahmed 2021).

2. Prior Training in Online Teaching

A statistically significant difference was observed between professors who received prior training in online teaching and those who did not ($t(298) = 6.12, p < .001$). Trained professors reported significantly higher scores in all measured domains—technological integration, online facilitation, and digital pedagogy. This supports the assertion that targeted training directly enhances faculty readiness to deliver effective online education. The strong effect size (Cohen's $d = 0.71$) underscores the value of institutional investments in ongoing professional development for online education. Training programs not only enhance

skills but may also boost faculty confidence and motivation in virtual settings. **Li KC, Wong BTM and Chan HT (2023)** highlights that multimedia-based distance learning is most effective when **interactive components** (e.g., quizzes, animations, discussion prompts) are embedded into instructional design. This supports the domain on *Digital Content Design and Delivery*. Blended learning literature underscores that combining synchronous and asynchronous methods promotes flexibility, higher student achievement, and satisfaction—tying into pedagogical design and engagement strategies in the scale.

DISCUSSION OF RESULTS

The findings of this study provide valuable insights into the relationship between demographic variables and online teaching competencies among university professors.

Firstly, the correlation analysis revealed that **teaching experience, academic discipline, and prior training** all have significant associations with online teaching skills. Professors with greater teaching experience demonstrated moderately higher online teaching proficiency, aligning with the argument of Kebritchi, Lipschuetz, and Santiago (2017) that pedagogical maturity contributes to adaptability in digital environments. However, the strength of the correlation suggests that while experience matters, it is not the sole determinant of competency.

Academic discipline was also found to be significantly related to online teaching skills, with faculty from **science and engineering disciplines** reporting higher levels of digital proficiency compared to humanities professors. This supports prior research (Basilotta-Gómez-Pablos et al., 2022; Jorge-Vázquez et al., 2021), which highlights that technology adoption often varies across disciplines due to differences in course content, pedagogical approaches, and resource availability.

Most notably, prior training in online teaching emerged as the **strongest predictor** of online teaching skills. The regression analysis confirmed that training programs substantially enhance faculty digital competencies, echoing the conclusions of Simsek et al. (2021) and Liesa-Orus et al. (2023), who emphasized that structured professional development opportunities directly translate into improved online instructional practices.

The regression model explained **21% of the variance** in online teaching skills, which indicates that while demographic factors play an important role, other influences such as institutional support, technological infrastructure, and personal motivation may also significantly impact teaching competencies. This observation resonates with the work of

Khodabandelou et al. (2022), who argued for a multi-dimensional understanding of faculty roles in online teaching.

In summary, the findings suggest that **training interventions and discipline-specific pedagogical support** are crucial for enhancing online teaching skills. Institutions should therefore invest in targeted professional development programs, while also encouraging cross-disciplinary collaborations to reduce the digital competence gap among faculty.

CONCLUSION AND IMPLICATIONS

This study set out to examine the influence of **teaching experience, academic discipline, and prior training** on the online teaching competencies of university professors. The results provide compelling evidence that all three demographic factors are significantly related to online teaching skills, with **prior training in online teaching** emerging as the strongest predictor.

The findings highlight that while **teaching experience contributes modestly** to online instructional proficiency, it does not guarantee digital readiness. Similarly, disciplinary differences remain evident, with faculty in **STEM-related fields** demonstrating stronger competencies compared to those in the humanities and social sciences. This reinforces the need for discipline-sensitive digital pedagogy initiatives.

From a practical perspective, the study underscores the **critical role of professional development**. Universities should design structured training programs, workshops, and faculty development initiatives focused on digital pedagogy, assessment, and ethical online practices. Additionally, cross-disciplinary sharing of best practices can help bridge the competency gap across academic fields.

At a policy level, higher education institutions should integrate **digital competency frameworks** into faculty evaluation and promotion systems, ensuring that online teaching proficiency is recognized as a core academic requirement. Moreover, the establishment of **institution-wide digital literacy benchmarks** will provide a standardized approach to enhancing the overall quality of online education.

In conclusion, the study affirms that **online teaching competence is not solely a function of experience but is strongly shaped by training and disciplinary context**. By investing in continuous professional development and embedding digital skills into institutional culture, universities can ensure that professors are adequately equipped to deliver **effective, engaging, and ethically responsible online education**.

Overall, the results emphasize the crucial role of structured training, mid-career engagement, and technological exposure in fostering effective online teaching skills. Institutions aiming to ensure quality digital education must design inclusive faculty development programs, consider the unique challenges of each discipline, and provide ongoing support for all teaching experience levels.

REFERENCE

1. Basilotta-Gómez-Pablos, V., Matarranz, M., Casado-Aranda, L. A., & de la Morena-Torres, E. (2022). Teachers' digital competencies in higher education: A systematic literature review. *International Journal of Educational Technology in Higher Education*, 19(8). <https://doi.org/10.1186/s41239-021-00312-8>
2. Borup, J., West, R. E., & Graham, C. R. (2012). Improving online social presence through asynchronous video. *The Internet and Higher Education*, 15(3), 195–203. <https://doi.org/10.1016/j.iheduc.2011.11.001>
3. Dennen, V. P., & Jones, M. K. (2022). The role of the online instructor. In *Handbook of Open, Distance and Digital Education* (pp. 1–20). Springer. https://doi.org/10.1007/978-981-19-0351-9_62-1
4. Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education*, 57(4), 2333–2351. <https://doi.org/10.1016/j.compedu.2011.06.004>
5. Hizam, S. M., Akter, H., Sentosa, I., & Ahmed, W. (2021). Digital competency of educators in the virtual learning environment: A structural equation modeling analysis. *arXiv*. <https://arxiv.org/abs/2105.08927>
6. Irfan Simsek, Kucuk, S., Biber, S. K., & Can, T. (2021). Development of an online teaching competency scale for university instructors. *Open Praxis*, 13(2), 126–139. <https://doi.org/10.5944/openpraxis.13.2.137>
7. Jorge-Vázquez, J., Nández Alonso, S. L., Fierro Saltos, W. R., & Pacheco Mendoza, S. (2021). Assessment of digital competencies of university faculty and their conditioning factors: Case study in a technological adoption context. *Education Sciences*, 11(10), 637. <https://doi.org/10.3390/educsci11100637>
8. Kebritchi, M., Lipschuetz, A., & Santiago, L. (2017). Issues and challenges for teaching successful online courses in higher education. *Journal of Educational Technology Systems*, 46(1), 4–29. <https://doi.org/10.1177/0047239516661713>

9. Khodabandelou, R., Chaharbashloo, H., Ghaderi, M., Zeinabadi, H., & Karimi, L. (2022). A systematic review on university instructors' roles and competencies in online teaching environments. *Interactive Learning Environments*, 32(6), 2506–2519. <https://doi.org/10.1080/10494820.2022.2152057>
10. Li, K. C., Wong, B. T. M., & Chan, H. T. (2023). Teaching and learning innovations for distance learning in the digital era: A literature review. *Frontiers in Education*, 8, 1198034. <https://doi.org/10.3389/feduc.2023.1198034>
11. Liesa-Orus, M., Lozano Blasco, R., & Arce-Romeral, L. (2023). Digital competence in university lecturers: A meta-analysis of teaching challenges. *Education Sciences*, 13(5), 508. <https://doi.org/10.3390/educsci13050508>
12. Martin, F., Budhrani, K., Kumar, S., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Roles and competencies. *Online Learning*, 23(1), 184–205. <https://doi.org/10.24059/olj.v23i1.1329>
13. Nicol, D. J. (2010). From monologue to dialogue: Improving written feedback processes in mass higher education. *Assessment & Evaluation in Higher Education*, 35(5), 501–517. <https://doi.org/10.1080/02602931003786559>
14. Ribble, M. (2011). *Digital citizenship in schools: Nine elements all students should know* (2nd ed.). International Society for Technology in Education.
15. Veletsianos, G. (2016). Digital learning environments in higher education: A research-based perspective. In G. Veletsianos (Ed.), *Emerging technologies in distance education* (pp. 13–25). Athabasca University Press.