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The Role of Instructor Digital Pedagogical Competence in Enhancing Learning Outcomes from Online Learning Platforms in Higher Education

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Abstract

This paper discusses and analyzes how instructor digital pedagogical competence would improve online learning outcomes provided by institutions of higher learning. The study is centred on how instructors can plan online material, online interaction, and timely feedback, and combine pedagogically viable online strategies to enhance student engagement, eagerness, and scholastic success. The quantitative research design was used, which included a sample of 360 undergraduate and postgraduate students of online and blended courses in the private universities. The Likert scale questionnaire was used to gather data, and the results were analyzed by employing descriptive statistics and regression analysis. The results suggest that an instructor's digital pedagogical competence can positively influence student learning outcomes significantly, especially with respect to the conceptual knowledge, critical thinking, and learner satisfaction. Problems that were associated were inconsistent instructional design, inadequate instructor preparation, and unequal distribution of digital pedagogy adoption. The paper demonstrates the significance of enhancing digital pedagogical capabilities of instructors in an attempt to maximize the utility of online education environments in higher education.

Keywords: Digital pedagogical competence, online learning platforms, instructor effectiveness, learning outcomes, higher education

Introduction

Online instruction has revolutionized the way learning is conducted in higher education because of the rapid growth of online learning sites. Digital infrastructure and learning management systems are also significant factors, but the success of online learning is mostly determined by the pedagogical use of such technologies by the instructors. The concept of instructor digital pedagogical competence is to have the knowledge, skills, and attitudes to plan, execute, and assess online teaching activities that are helpful in facilitating significant learning. This competence exceeds technical skills and focuses on design and instructional elements, engagement, and evaluation techniques, as well as feedback options in online contexts (Songkram et al., 2023).

The online learning practices are flexible, available, and have interactive learning opportunities. Without skillful instructional supervision, these platforms might not come up with the expected learning effects. Teachers must transform the traditional methods of teaching to online areas through digital pedagogy that will support active learning, group interaction, and critical thinking. Successful digital pedagogy can help instructors effectively design material, engage learners, and meet the needs of various learners (Martin et al., 2020).

The move towards online learning in institutions of higher learning, particularly in the developing world, has put into the limelight the difference in the preparedness of the teachers to deliver effective teaching in online environments. Variations in pedagogical trends, trust in online facilitation and assessment practices all affect the learning experience and outcomes of students. Thus, the role of the instructor's digital pedagogical competence is an important consideration towards a formulation of how online learning platforms can be exploited to enhance academic performance and learner engagement (Tondeur et al., 2021).

Background

Technological advancement and the transition in educational demands have increased the move to online learning platforms in higher education. Virtual learning environments are becoming more important to universities because they are used to provide courses, blends, and improve access to education. Although these platforms offer the technological background, the quality of instruction is a fundamental factor in learning success (Hodges et al., 2020).

Online learning has developed to be affected by the instructor's digital pedagogical competence as one of its factors. Skilled teachers can match the learning goals with online practice, apply interactive tools intentionally, and offer systematic instructions that can facilitate student learning. Conversely, low pedagogical competency can lead to bad course design, low learning experiences, and low motivation among students (Rapanta et al., 2020).

Most institutions of higher education have teachers with different experiences in online teaching. Some can effectively combine the use of digital tools and pedagogy, whereas others have to use a lot of content without much interaction. These differences can be catastrophic to the engagement, satisfaction, and academic performance of students. It is critical to comprehend instructor competence in relation to learning outcomes to enhance the quality of online education (Schindler et al., 2020).

Statement of Problem

With the massive use of online learning platforms in higher education, there has been a variation in learning outcomes between institutions and course offerings, which means that the availability of technology is not an instantly guaranteeing factor in reducing education. The difference in the level of digital pedagogical competence in instructors is among the key replicative issues. Although most instructors have fundamental technical abilities to work with online platforms, they do not have the pedagogical knowledge to create an interesting, interactive, and learner-focused online teaching experience. This drawback impacts the quality of instruction design, efficacy of online feedback, and compatibility of digital evaluations with learning goals, which consequently will have a result on student engagement, motivation, and academic achievements.

Research Questions

1. What are students' perceptions of instructors' digital pedagogical competence in online learning platforms?
2. What is the impact of instructor digital pedagogical competence on student learning outcomes in higher education?
3. What challenges affect the effective application of digital pedagogy by instructors in online learning environments?

Significance of the Research

This study would be of importance to institutions of higher learning that would want to enhance the quality of online learning. Through the investigation of instructor digital pedagogical competence, the study can shed light on the effects of teaching practises on student engagement, understanding, and academic performance. The possible implications of the findings for the institutional choices are: instructor training, instructional design, and digital teaching policies (Koehler et al., 2021).

The study is important to instructors, as it provides them with significant pedagogical skills that lead to effective teaching online, which is the driver of professional growth. In the case of students, better instructor competence may introduce interactive learning, better instructional direction, and higher academic achievement. On the institutional level, the study can be used to develop dedicated training opportunities to facilitate the progression of digital pedagogy and the effectiveness of the target online education, in general (Philipsen et al., 2019).

Literature Review

Instructor Digital Pedagogical Competence

Instructor digital pedagogical competence can be defined as educators being capable of intentionally combining digital technologies and effective pedagogical principles with the safe aim of improving the processes of teaching and learning in online and blended classrooms. This competence goes

beyond the rudimentary technical skills and focuses on instructional design, learner-centred pedagogy, aligning the assessments, and appropriately providing feedback (Tondeur et al., 2021). In the case of online learning, online instructors must create a structured learning experience that enables interaction, autonomy, and cognitive engagement, and also use online learning tools used to facilitate learning goals and not to distract from the same. Skilled instructors select and appropriately use digital materials, i.e., multimedia content, discussion forums, and other collaborative devices, to construct meaningful learning activities to fit all needs of learners (Martin et al., 2020). With higher education getting more dependent on the online platform, the digital pedagogical competence of the instructor has taken the center-stage in the determination of instructional quality and effectiveness in education.

Digital pedagogical competence refers to the capacity to adjust pedagogical practices to the opportunities and limitations of Web-based environments. The instructors should be able to introduce the traditional teaching practices in a digital format without losing clarity, coherence, and pedagogical purpose. This involves the creation of activities that promote navel musing, teamwork, and critical reasoning, and the handling of online classrooms in a manner that creates a feeling of presence and academic assistance. Consequently, instructor competence has a direct effect on the quality of the perception of students about the competence of online educational experiences and online learning (Rapanta et al., 2020), which is why it is one of the central areas of research in the sphere of higher education.

Impact on Student Engagement and Motivation

Learning activities like student participation and involvement are core elements of effective learning, especially in online learning, where bodily distance can diminish communication and responsibility. Digital pedagogical competence of instructors is critical in maintaining the engagement of students through the design and delivery of learning activities (Bond et al., 2020). Learners are prone to be engaged in the learning process when their instructors apply interactive pedagogies, engage, and stay in constant communication. Through the adoption of instructional strategies such as guided conversations, group assignments and feedback, the interactive learning environment would be created to enable the provision of motivation and persistence.

The effectiveness of instructors in establishing clear expectations in an online learning process, as well as in providing helpful guidance, is highly required for the success of your motivational effort in online learning. Skilled teachers introduce the learning outcomes in a clear manner and also give competent feedback so that they can be able to monitor their performance and achievement. This form of instructional assurances encourages the students more and makes them strive harder. Pedagogical direction or inadequate communication may result in disengagement and lack of motivation (Xie et al., 2021).

Influence on Learning Outcomes

The results of learning in online education are closely interconnected with the quality of instructional practices applied by the instructors. Digital pedagogical competence will enable instructors to develop learning experiences in a manner that will help them gain a deeper understanding of key elements, gain critical thinking and acquire practical skills (Means et al., 2020). Online modules are designed

well and contain learning processes, scaffold activities and tests which are stated to fulfil the intended designs. The more effectively teachers apply effective digital pedagogy, the more favourable place they prevail in order to teach students to apply what has been taught in practice to increase academic achievements and skills acquisition capacity.

Timely and positive feedback is also another factor of importance that contributes to the learning outcomes in an online environment. Effective educators apply computer technologies in providing specific, practical and evaluation-oriented feedback. The students use this feedback to understand what they are and are not strong or weak, which can be regarded as the most desirable support in self-directed learning and academic growth. Thus, it is expected that the learners in the programs provided by pedagogically qualified teachers will report high levels of knowledge, enhanced learning, and satisfaction with the online learning programs (Wisniewski et al., 2020). These results highlight the capability of teachers in identifying which education has succeeded in the online learning environment.

Barriers to Effective Digital Pedagogy

Although digital pedagogical competence in the instructors has been identified as a significant practice, practises to facilitate IDC related practices in the higher education setting have been derailed by several problems. The first one is the inaccessibility of the professional development opportunities due to the fact that a considerable proportion of the instructors did not receive any formal training in digital pedagogy (König et al., 2020). They will be teaching using the old teaching methods that do not translate into online platforms without having properly trained teachers, hence sacrificing teaching levels.

Institutional factors are also what bring about the disparities in digital pedagogical practice. Weak support systems, absence of standardized instruction design rules, and insufficient appreciation of digital teaching can discourage instructors from establishing themselves fully in pedagogical innovation. Change resistance is another issue that intensifies such challenges, especially among those instructors who are less certain about using digital technologies. These barriers need to be addressed to improve the instructor's digital pedagogical competence (Schindler et al., 2020), and online learning platforms fulfill their promise of better learning outcomes in higher education.

Theoretical Framework

This research is based on a pedagogical competence framework, which focuses on the systematic nature of incorporating technology, pedagogy, and instructional practice in online learning. The framework presupposes that successful online teaching cannot be realized through the only impact of technological adoption, but the skills of instructors to implement the pedagogical strategies focused on the learner with the help of digital resources. Instructor digital pedagogical competence involves the ability to design, facilitate interaction, align assessment, and provide feedback that influences the quality of learning experiences among the learners in an online platform (Tondeur et al., 2021).

In this model, instructor competence will be a mediator between digital learning environments and student learning achievement. Effective teachers will ensure that they prepare well-organized learning tasks, facilitate interaction, and adjust the instructional methods to suit the needs of various learners.

This consequently improves learning outcomes, which include academic performance, conceptual understanding, and critical thinking. The framework thus offers a consistent prism into the study of the effects of instructor-level parsimonious pedagogy in online programs on student interaction and learning outcomes in postsecondary education (Martin et al., 2020).

Methodology and Procedure

The research paradigm that is used is a positivist research paradigm and a quantitative research paradigm to examine the correlation between instructor digital pedagogical competence and student learning outcomes. This kind of paradigm is quite suitable as it offers the prospect of measuring, experimenting with assumptions, and statistically testing the association between variables. Because it would be effective to assess the existing practice and its perceived impacts on the learning outcomes in the online and blended learning settings, the cross-sectional survey design was decided on to work with a plain observation of the perception of the students related to a single moment in time (Creswell & Hirose, 2019).

The online classes provided by the private universities were the target population of online and blended curriculum students. The sampling size (360 students) was selected based on a stratified random selection process in order to ensure equal sampling of all the universities and academic courses. The tool of the data collection was a five-point Likert (score) structured questionnaire, which was created to cover the perceptions of instructor digital pedagogical competence, learning engagement, and academic performance. The strategy ensured uniformity, dependability, and suitability in statistics (Hair et al., 2020).

Data Collection and Analysis

The study relied on a self-administered questionnaire, which was offered to the students who took part in the research through electronic channels. The instrument was so constructed that it captured different variables of instructor digital pedagogical competence, including instructional design, online interaction development, assessment, and feedback effectiveness. Other measures measured perceived learning, which comprised academic performance, conceptual learning and skill development. Items were based on Likert scales, and this enabled them to authorize the measurements of perceptions, not to mention the comparisons across variables (Boateng et al., 2018).

The analysis of data used descriptive and inferential statistics. Students' perceptions were summarized using descriptive statistics to draw out the general response patterns as represented by the mean scores and standard deviations. Regression analysis was used as the inferential analysis to test the predictive relationship between instructor digital pedagogical competence and learning outcomes. This analysis enabled the study to establish the nature, direction, and statistical significance of relationships among the most important variables, which brings empirical data to the subject of the research objectives of the study (Field, 2020).

Data Analysis and Interpretation*Table 1: Responses about Students' Perceptions of Instructor Digital Pedagogical Competence*

No.	Survey Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
1	Instructor clearly organizes and structures online course content in a pedagogically effective manner.	6	12	28	132	182	4.53	0.74
2	Instructor effectively facilitates online discussions to promote critical thinking and interaction.	7	14	30	128	181	4.50	0.76
3	Instructor's use of multimedia (videos, demonstrations, guided activities) improves my understanding of course concepts.	8	16	32	125	179	4.47	0.79
4	The instructor provides timely and constructive feedback that supports my learning progress.	5	10	25	130	190	4.57	0.71
5	Instructor effectively integrates digital tools with teaching strategies rather than using them only for content delivery.	7	15	29	133	176	4.49	0.77
6	Instructor designs online learning activities that actively engage students rather than relying on passive learning.	9	18	34	122	177	4.46	0.80
7	The instructor's online communication style makes me feel supported and connected to the course.	6	13	27	135	179	4.52	0.73
8	Instructor adapts teaching methods based on students' needs and feedback in online learning environments.	10	20	36	120	174	4.41	0.82

Interpretation

The mean scores demonstrate much agreement among the students regarding the efficacy of online **instructors' digital pedagogical** competency. The average scores are **4.41 and 4.57**, respectively, meaning that students highly perceive that instructor pedagogy is not only about technology utilization as a significant factor of engagement and effectiveness in learning. The most common point of score (**4.57**) is related to areas of timely and constructive feedback, which also demonstrates that pedagogically informed feedback is very significant in the field of online education. The small

standard deviations suggest high measures of congruency among the respondents, which means that the extent of similarity among the teacher-learner instructional practices will be great.

Figure 1: Graphical Representation of Responses

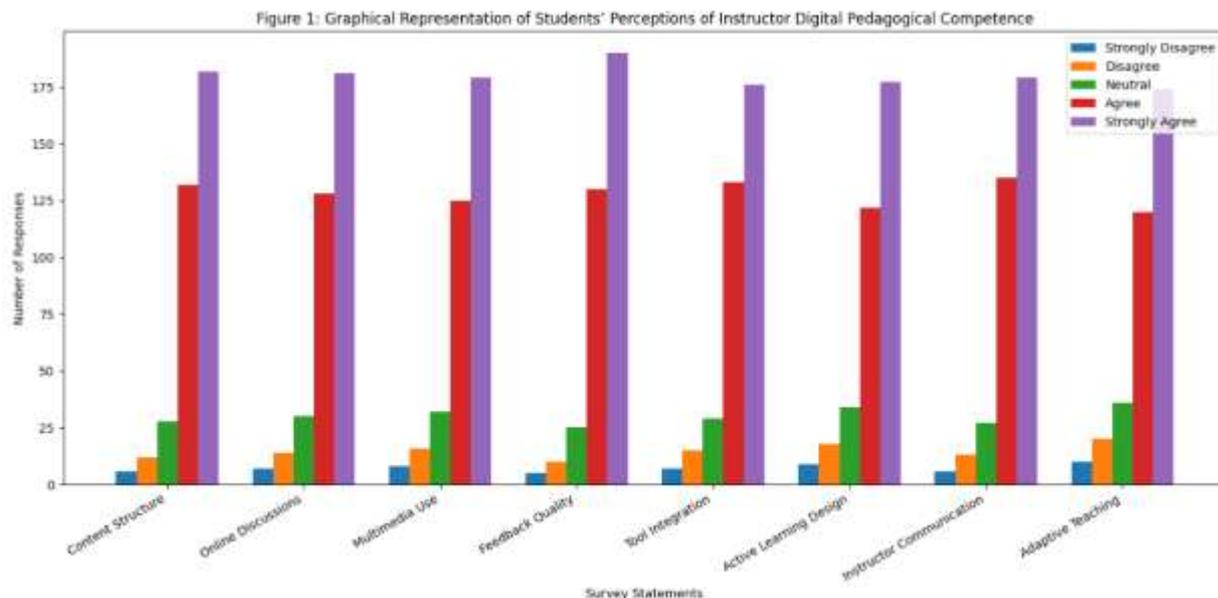


Table 2: Responses about the Impact of Instructor Digital Pedagogical Competence on Academic Performance and Learning Outcomes

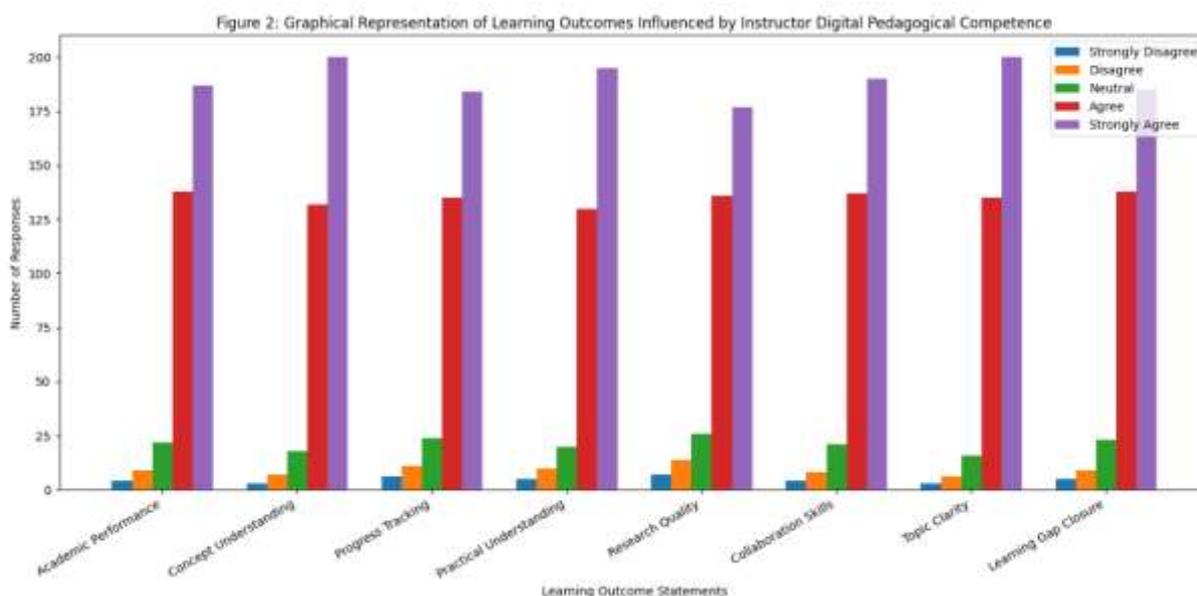
No.	Survey Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
1	Instructor’s effective digital teaching practices have improved my overall academic performance.	4	9	22	138	187	4.56	0.73
2	Pedagogically well-designed online lessons have enhanced my understanding of complex course concepts.	3	7	18	132	200	4.61	0.69
3	Instructor-guided online assessments help me track my progress and identify areas for improvement.	6	11	24	135	184	4.49	0.77
4	Instructor use of digital simulations, case-based tasks, or applied activities has strengthened my practical understanding.	5	10	20	130	195	4.57	0.71
5	Instructor guidance in using online academic resources has	7	14	26	136	177	4.47	0.79

	enhanced the quality of my research and assignments.							
6	Instructor-facilitated online collaboration has improved my teamwork and project-based learning skills.	4	8	21	137	190	4.55	0.74
7	Instructor-created instructional videos and explanations have clarified difficult topics effectively.	3	6	16	135	200	4.63	0.67
8	Instructor feedback and follow-up support in online learning have helped me close learning gaps.	5	9	23	138	185	4.54	0.75

Interpretation

The findings also reveal that an instructor's digital pedagogical competence significantly affects the academic performance and even the learning outcome of students in a positive way. The range of the mean scores measures between **4.47** and **4.63**, demonstrating a high degree of congruence that the pedagogically competent instructors play a significant role in improving understanding, academic performance, and skills acquisition in online classrooms. A mean score of **4.63** is attributed to instructor-developed instructional explanations, indicating that pedagogically structured content delivery in the digital environment is important. Small values in standard deviation show that there is high congruency in student perceptions, which implies that effective digital pedagogy is a major contributing factor to better outcomes of learning in courses.

Figure 2: Graphical Representation of Responses



(Impact of Instructor Digital Pedagogical Competence on Learning Outcomes)

Table 3: Regression Analysis Table

Predictor Variables	Coefficient (β)	Standard Error	t-value	p-value
Digital instructional design quality	0.41	0.09	4.56	<0.001
Effectiveness of online facilitation	0.38	0.08	4.47	<0.001
Pedagogical use of multimedia resources	0.34	0.07	4.31	<0.001
Instructor feedback effectiveness	0.46	0.10	4.62	<0.001
Alignment of online assessments with learning objectives	0.32	0.08	4.05	<0.001
Instructor-guided collaborative learning	0.36	0.09	4.18	<0.001
Instructor-created instructional videos	0.44	0.11	4.40	<0.001
Instructor's adaptability to learner needs	0.29	0.07	4.01	<0.001
Timely academic support and follow-up	0.35	0.08	4.22	<0.001
Pedagogical management of online learning flexibility	0.31	0.08	3.98	<0.001

Interpretation

The regression analysis shows that each of the predictor variables of instructor digital pedagogical competence has a positive influence on the learning outcomes that are statistically significant and have p-values less than 0.001. Effectiveness of instructor feedback ($\beta = 0.44$) and instructional videotape design ($\beta = 0.44$) turned out to be the strongest predictors, meaning that pedagogically informed guidance and explanation are a key feature of promoting student learning. The other important foretellers are the design quality of instructions, online guidance, and learning in a group. In general, the results prove that there are significant and significant relationships between instructor digital pedagogical competence and enhanced academic performance and learning outcomes in online learning settings.

Table 4: Responses about Challenges and Barriers to Instructor Digital Pedagogical Competence

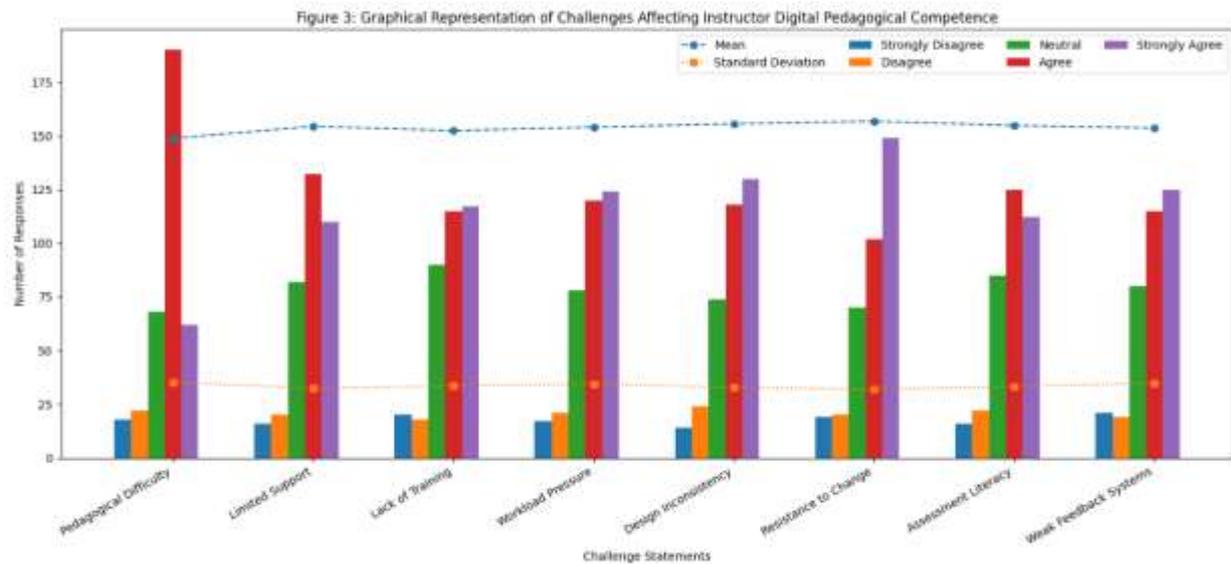
No.	Survey Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
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1	Instructors face difficulties in applying effective digital pedagogy in online teaching.	18	22	68	190	62	3.72	0.88
2	Limited institutional support hinders instructors' ability to improve digital pedagogical skills.	16	20	82	132	110	3.86	0.81
3	Lack of formal training programs affects instructors' digital pedagogical competence.	20	18	90	115	117	3.81	0.84
4	Insufficient time and workload pressure limit instructors' adoption of innovative digital teaching strategies.	17	21	78	120	124	3.85	0.86
5	Inconsistent instructional design standards reduce the effectiveness of online courses.	14	24	74	118	130	3.89	0.82
6	Resistance to pedagogical change affects instructors' willingness to adopt digital teaching approaches.	19	20	70	102	149	3.92	0.80
7	Limited digital assessment literacy affects instructors' ability to evaluate learning outcomes effectively.	16	22	85	125	112	3.87	0.83
8	Insufficient feedback mechanisms reduce the effectiveness of online learning experiences.	21	19	80	115	125	3.84	0.87

Interpretation

The findings show that there is a moderate to high level of consensus on issues that influence instructor digital pedagogical competence. The mean scores are in the range of **3.72 to 3.92**, which means that training laboratory, institutional support restrictions, workload pressures, and resistance to pedagogical change are the main obstacles on the way to successful digital teaching. The largest mean (**3.92**) is the resistance to change in pedagogy, which presupposes that cultural and behavioural outcomes have a fundamental role in the uptake of digital pedagogy. These results indicate that specific professional growth and institutional measures are required to enhance the digital pedagogical competence of the instructors.

Figure 3: Graphical Representation of Responses



Discussion

The results in this study vividly reveal that the digital pedagogical competence of the instructor has a conclusive influence on the improvement of learning outcomes with the learning platform of online education in higher education. The descriptive findings show that the mean scores were always high in such dimensions as quality of instruction design, the ability to facilitate online interaction, the adequacy of feedback, and the adequacy of the assessment. These findings indicate that learning by students is highly enhanced when teachers can combine pedagogical concepts and digital programs, and not use technology entirely to pass content. This trend is also supported by the graphics, as high consensus rates among the respondents can be observed in their responses to the subject of the positive impact of instructor-led digital pedagogy on engagement, understanding, and academic performance (Martin et al., 2020).

These results are strongly backed by the regression analysis, where it can be stated that all the predictors in pedagogy positively affect learning outcomes in a statistically significant manner. Specifically, the effectiveness of instructor feedback and instructional resources, which have been designed pedagogically, were found to be the most powerful predictors, and they draw our attention to the significance of the organization of guidance and effective interactions in the online learning settings. These findings suggest that only the use of the platform does not motivate learning outcomes, but rather, the design, facilitation, and management of the learning experience in the platforms by the instructors. This puts in focus how teachers form critical pedagogical agents of digitally mediated education (Wisniewski et al., 2020).

Along with such positive results, the study also discloses many obstacles that hinder the effective digital pedagogy. The results about the issues of problems and impediments show a moderate to high agreement around the following issues: low training opportunities, workload stress, adherence to pedagogical change, and lack of institutional support. Such limitations can limit the extent to which the instructors can keep refining their online teaching practice, which minimizes the effectiveness of the online learning platforms. These obstacles, therefore, need to be addressed in an attempt to

maintain and increase the benefits of instructor digital pedagogical competence in higher education (König et al., 2020).

Conclusion

This paper has come to the conclusion that an instructor's digital pedagogical competence is a decisive factor in successful online higher education. These findings present great empirical support for the fact that educators who successfully design digital learning tasks, mediate interaction, match measures with learning goals, and deliver prompt responses go a long way in increasing student engagement, learning, and academic achievement. Although the online learning platform provides flexibility and accessibility, educational outcomes have been heavily reliant on the ability of instructors and the pedagogical skills of the platform, as opposed to the technological attributes (Rapanta et al., 2020).

The paper explains that systematic support of instructors is vital to the online learning initiation success, in the long-run. Unless properly trained, supported by the institutions, and guided by pedagogical perspectives, the prospects of digital learning platforms can go to waste. The ability of instructors to obtain increased and enhanced digital pedagogical competency is therefore necessary not only in enhancing the learning outcomes but also the sustainability and quality of online higher education (Philipsen et al., 2019).

Recommendations

Based on the findings of this study, the following recommendations are proposed:

- Enhance professional development efforts and practices in digital pedagogy with emphasis on instructional design, online facilitation, alignment of assessment, and good practices in feedback other than solely on technical skills.
- Standardize instruction design in online courses to provide uniformity, quality, and correspondence among the learning goals, teaching activities, and assessment.
- Give long-term institutional encouragement in terms of time, resources, and technical support to promote ongoing pedagogical creativity in online instruction.
- Foster reflective teaching explicitly by assisting instructors to engage in frequent reconsideration of student feedback, learning analytics, and teaching results as a way of enhancing online teaching techniques.
- Introduce frequent assessment of the effectiveness of teaching online with surveys of students, peer feedback, and performance indicators to support the efforts of continuous improvement and professional development (Tondeur et al., 2021).

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