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Digital Courses Integration in Rehabilitation: Enhancing Learning Motivation of Undergraduate Students

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Background: Digital learning has become integral to higher education, providing flexibility, accessibility, and global knowledge sharing. While digital courses are increasingly adopted worldwide, limited evidence exists on their integration in rehabilitation education and their impact on student motivation in South Asian contexts. This study aimed to evaluate the influence of digital courses on learning motivation among undergraduate rehabilitation students.

Methods: A cross-sectional study was conducted at Ziauddin University over six months. Using convenience sampling, 384 undergraduate rehabilitation students were recruited. Data were collected via a validated questionnaire distributed through Google Forms, employing a 5-point Likert scale. Reliability testing achieved a Cronbach's alpha of 0.8. Descriptive and inferential analyses were performed using non-parametric tests due to non-normal data distribution. Spearman's rho correlation assessed the relationship between learning motivation and technological dependence.

Results: The majority of participants (63.8%) were aged 20–25 years, with females representing 79% of the sample. Degree distribution included Doctor of Occupational Therapy (35.9%), Doctor of Physical Therapy (34.1%), and Speech Therapy (28.2%). Physiopedia was the most preferred platform (85.6%), followed by Coursera (14.4%). Overall, 79.3% of students expressed motivation toward digital learning. Students strongly agreed that digital courses enhance flexibility (79.3%), autonomy (78.1%), and comprehension of complex concepts (76%). No significant correlation was found between motivation and technological dependence ($r = 0.040$, $p = 0.428$).

Conclusion: Digital courses positively influence learning motivation in undergraduate rehabilitation education. Integrating digital platforms alongside traditional methods may optimize student engagement and educational outcomes.

Keywords: *Digital Learning, Rehabilitation Education, Undergraduate Students, Learning Motivation, Physiopedia.*

Introduction

Higher education has undergone a significant transformation with the widespread integration of digital learning into academic frameworks. Approximately 60% of higher education

institutions worldwide adopted digital courses by 2023, with Europe and North America leading at 75% integration.[1,2] Digital platforms such as Learning Management Systems, online educational resources, and hybrid approaches have expanded opportunities, particularly in specialized fields like rehabilitation sciences.

Digital learning provides multiple benefits, including enhanced knowledge acquisition,• increased engagement, flexibility, and exposure to global expertise.[3,4] Studies show a 20–30% improvement in student motivation in digital environments, particularly where learners control pace and scheduling.[5] Additional• advantages include accessibility of resources,[6] flexibility in time and location,[7] personalized learning experiences,[8] collaboration,[9] technology skill development,[10] interactive learning,[11] promotion of lifelong learning,[12] and cost-effectiveness.[13]

Research further indicates that digital courses positively impact student motivation, retention, and performance.[14–22] Despite these benefits, digital literacy and infrastructure challenges persist in developing countries, including Pakistan.[15,21,22] While numerous studies explore e-learning in general, limited research addresses digital course integration within rehabilitation education, especially in South Asian contexts.

This study investigates the role of digital learning in enhancing motivation among undergraduate rehabilitation students, providing evidence to inform curriculum development and future educational strategies.

Methodology

Study Design and Setting

This cross-sectional study was conducted at Ziauddin University, focusing specifically on undergraduate rehabilitation students. approval.

Participants and Sampling

The target population comprised undergraduate rehabilitation students from Ziauddin University. Using convenience sampling methodology, we calculated a sample size of 384 participants through OpenEpi version 3.0 software.

Eligibility Criteria

Students enrolled in undergraduate rehabilitation program were included while post-graduate students and students from healthcare disciplines other than rehabilitation were excluded.

Data Collection Instrument

A custom-designed questionnaire was developed for data collection, utilizing a 5-point Likert scale for response measurement. The questionnaire development underwent a rigorous three-tier validation process:

- **First Tier:** Initial small-scale data collection revealed low reliability with a Cronbach's alpha value of 0.5.
- **Second Tier:** Questions were modified and rephrased based on initial reliability results; however, reliability remained suboptimal despite these changes.
- **Third Tier:** Factor analysis was performed to identify problematic questions and analyze specific factors impacting reliability. Following the rephrasing of identified problematic items, a final reliability test achieved significant improvement with a Cronbach's alpha value of 0.8.

Data Collection Procedure

Study participants were recruited through convenience sampling at Ziauddin University. A Google Forms questionnaire was created and distributed to participants via email and WhatsApp groups. All participants provided informed consent prior to data collection, ensuring voluntary participation.

Ethical Considerations

Participant consent was obtained after thorough explanation of the study's purpose and procedures. Privacy was ensured through response anonymization and secure data storage. Complete transparency was maintained regarding research objectives and data usage, avoiding any form of deception. This study received approval from the Institutional Review Board (IRB) at Foundation of Medical Research and Laboratories (FMRL) under IRB Protocol Number: FMRL-IRB/2024/026.

Results

Demographic Characteristics

The age distribution of participating undergraduate students demonstrated a concentration in younger demographics. Specifically, 35.9% of participants were aged 16-19 years, while a substantial majority (63.8%) fell within the 20-25 year age range. Only 0.3% of participants were above 25 years of age. This demographic skew toward younger students suggests particular relevance of digital courses for early-stage undergraduate students who are adapting to emerging learning technologies and methodologies.

Gender distribution revealed a significant disparity, with females comprising 79% of the sample compared to 21% males. This pronounced female majority reflects common trends in health-related undergraduate programs, which typically experience higher female enrollment rates. This gender variation necessitates consideration when developing digital course content and participation strategies to address the needs of the predominant demographic.

Academic Specialization

Participant degree specializations were diverse within the rehabilitation field. The largest group pursued Doctor of Occupational Therapy (DOT), accounting for 35.9% of the sample. Doctor of Physical Therapy (DPT) students comprised 34.1%, while Speech Therapy students represented 28.2%. Smaller numbers of participants studied Psychology (0.3%) or Sports Sciences (1.5%). This distribution highlights the prominence of rehabilitation-focused disciplines within the sample and underscores the relevance of digital courses to these specialized fields.

Digital Platform Preferences

Regarding digital learning platform usage, Physiopedia emerged as the overwhelmingly preferred choice, selected by 85.6% of respondents. In contrast, only 14.4% of students utilized Coursera. The dominance of Physiopedia indicates its perceived value and effectiveness in delivering relevant content to rehabilitation students.

Statistical Analysis

Normality testing using both Kolmogorov-Smirnov and Shapiro-Wilk tests indicated that data for learning motivation and technological dependence levels did not follow normal distribution patterns. For learning motivation, the Kolmogorov-Smirnov statistic was 0.124 with significance $p<0.001$, while the Shapiro-Wilk statistic was 0.909 with significance $p<0.001$. Similarly, for technological dependence levels, the Shapiro-Wilk statistic was 0.942 ($p<0.001$) and the Kolmogorov-Smirnov statistic was 0.175 ($p<0.001$). These findings violated normality assumptions, necessitating the use of non-parametric analytical techniques.

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
LEM	.124	390	.000	.909	390	.000
TDL	.175	390	.000	.942	390	.000

a. Lilliefors Significance Correction

Figure-1 Test of Normality

Spearman's rho correlation analysis revealed a very weak positive relationship between learning motivation and technological dependence levels (correlation coefficient = 0.040, p = 0.428). This indicates no statistically significant correlation between technological dependence levels and learning motivation among participants.

Spearman's rho	LEM	Correlation Coefficient	1.000	.040
		Sig. (2-tailed)	.	.428
		N	390	390
	TDL	Correlation Coefficient	.040	1.000
		Sig. (2-tailed)	.428	.
		N	390	390

Figure-2 Correlation Test

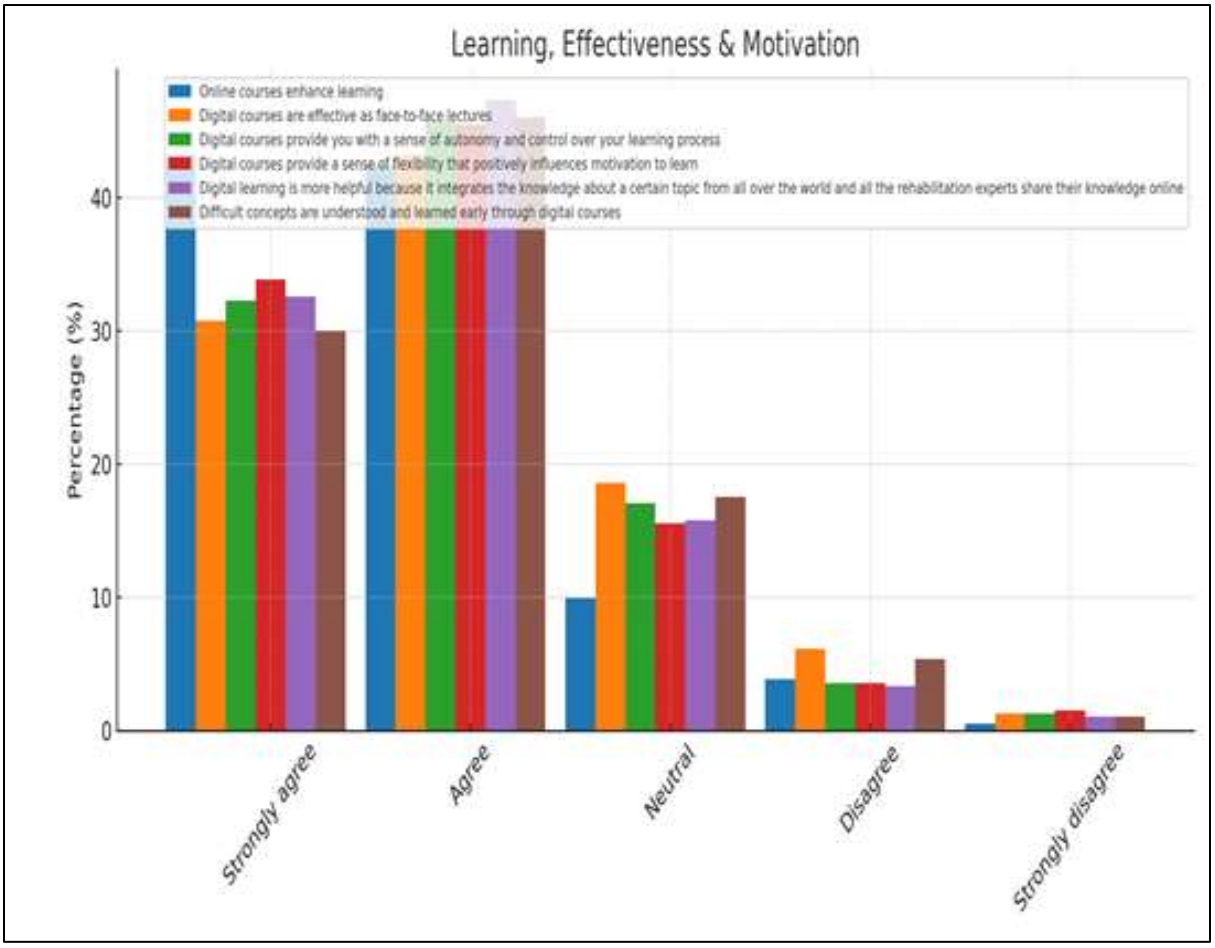

Figure-3 Learning, Effectiveness and Motivation

Learning Effectiveness and Motivation

Most students expressed positive attitudes toward digital learning. Over 85% agreed that online courses enhance learning, provide autonomy, and improve flexibility. A majority also valued global knowledge integration and found complex concepts easier to understand through digital platforms.

Traditional versus Digital Learning

While students recognized certain strengths of traditional learning—such as superior knowledge acquisition, teacher-student interaction, and hands-on clinical experience—support for these was moderate (about 20–23%). Overall, digital courses were perceived as more effective and motivating than traditional methods.

Overall Motivation Levels

The study findings highlighted that 79.3% of undergraduate rehabilitation students demonstrated motivation toward learning through digital courses, indicating substantial acceptance of digital educational modalities within this population.

Discussion

This research aimed to assess undergraduate rehabilitation students' motivation toward completing digital courses, identify challenges in online learning integration within undergraduate rehabilitation programs, and explore correlations between digital and traditional learning approaches. To our knowledge, this represents the first study specifically focusing on digital learning among undergraduate rehabilitation students.

Our study included 392 participants from occupational therapy, physiotherapy, speech therapy, and sports sciences disciplines. The investigation revealed that 85.7% of students utilize Physiopedia for digital courses, while 14.3% use Coursera. The age distribution showed 64% of participants between 20-25 years and 35.7% between 16-19 years. Gender distribution indicated 78.6% female and 21.4% male participants.

The learning effectiveness and motivation analysis demonstrated strong positive responses toward digital learning. Specifically, 85.7% of participants (combining "strongly agree" and "agree" responses) indicated that online courses enhance learning, while 78.1% agreed that digital courses provide learning autonomy and control. Additionally, 79.3% agreed that digital course flexibility positively influences learning motivation, and 79.8% agreed that digital learning benefits from integrated global knowledge sharing among rehabilitation experts. Furthermore, 76% agreed that complex concepts are more easily understood through digital courses.

Regarding traditional versus digital learning comparisons, results showed more moderate agreement levels. Only 23.2% strongly agreed that traditional learning provides superior knowledge, 21.7% strongly agreed about benefits of continuous teacher-student interaction, 22.2% strongly agreed about clinical experience advantages, and 18.9% strongly agreed that traditional learning contributes more to student learning than digital alternatives.

These findings align with existing literature supporting digital learning effectiveness. A 2021 study found that online courses can reduce degree program duration while positively impacting retention and graduation rates, demonstrating that digital learning can enhance both institutional efficiency and student success outcomes.[14] Pakistan's digital literacy development remains challenging in the current era where digital learning represents advanced educational standards. A University of Lahore study involving 205 students examined e-learning effectiveness, determining that digital learning provides temporal flexibility and motivates independent work. The study concluded that e-learning systems offer valuable time flexibility for student learning.[15]

Additional research suggests that online learning creates new opportunities for enhancing higher education processes and individual student experiences and outcomes. Such improvements require clear understanding of student performance, robust perspectives for student comprehension, efficient methods for collecting and interpreting large data quantities, and evidence-based academic leadership approaches.[16]

A 2020 study examining digital learning's impact on student motivation during the COVID-19

pandemic concluded that digital learning significantly influences student motivation during crisis periods. Students typically demonstrate higher learning motivation levels when utilizing digital learning platforms. Strong learning motivation increases student likelihood of engaging in digital learning and achieving educational objectives.[17]

Research completed in 2015 demonstrated strong correlations between student motivation and e-learning utilization. Students are likely to demonstrate increased motivation when using e-learning platforms. Enhanced learning motivation frequently results in successful study engagement, ultimately helping students achieve learning objectives.[18] Comparative research by Rovai, Ponton, Wighting, and Baker (2007) examining student motivation in traditional classrooms versus online learning environments revealed that online learning students demonstrate higher intrinsic motivation levels than traditional classroom students.[19]

A 2021 study aimed to determine which digital technology integration aspects help students become more academically engaged and perform better, and how Problem-Based Learning (PBL) environments support these processes. Results suggested that students who utilize user-friendly and beneficial digital technologies become more deeply involved in PBL approaches, with these connected relationships positively enhancing academic performance.[20]

A 2012 Pakistani study comparing traditional and online learning determined that conventional instructional methods significantly influence personality development. Both respondent groups agreed that e-learning represents a viable alternative to traditional classroom instruction and that online resources are equally useful as in-person alternatives. Students utilizing e-learning demonstrated increased motivation levels.[21]

Following COVID-19, e-learning popularity has increased significantly, making research into online learning effectiveness among students increasingly important. After evaluating digital course effectiveness results, strategies and curricula can be developed to enhance e-learning effectiveness. Research results can identify gaps for improving e-learning quality, such as incorporating visual aids, tutorials, and videos to enhance student learning experiences. This research helps identify student learning and motivation needs while identifying contributing factors that influence student learning outcomes.[22]

Limitations

This study has several limitations. The single-institution setting and moderate sample size may restrict generalizability. Focus was limited to Physiopedia and Coursera, excluding other platforms. The cross-sectional design prevents conclusions about long-term effects or causality. Lack of direct comparison with traditional learning also limits insights into relative effectiveness.

Conclusion

This study demonstrates that undergraduate rehabilitation students show strong motivation toward digital learning, with 79.3% reporting positive attitudes. Physiopedia was the most preferred platform, reflecting its relevance in rehabilitation education. Digital courses enhance flexibility, autonomy, and global resource access, though no significant correlation was found between motivation and technological dependence.

These findings support the integration of digital and traditional methods to optimize educational outcomes. Continued investment in digital learning infrastructure and tailored course

design is recommended to sustain motivation and improve academic performance among rehabilitation students.

Author Contributions

Fasiha Shah: Conceptualization, study design, supervision, critical review of the manuscript.

Arfa Fatima: Data collection, drafting of the manuscript.

Mariam Hashmi: Literature review, data collection.

Hafsa Waseem: Data analysis, interpretation of results.

Sibaal Faisal: Proofreading, editing, referencing.

Hamda Anis: Questionnaire design, formatting, final approval of the manuscript.

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None.

Conflict of Interest

The authors declare no conflicts of interest in relation to this research study.

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