Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i7.6906

A COMPUTATIONAL AND STATISTICAL ANALYSIS OF RELATIONSHIP BETWEEN STUDENTS' ONLINE LEARNING READINESS AND SELF-REGULATION AT UNIVERSITY LEVEL

Muhammad Umaid Siddiqui[1], Sameen Siddiqi[2*], Hafiza Fatima Iqbal[3], Zia-ud-din Akhtar[4], Ayesha Qasim[5]

[1]National University of Computer & Emerging Sciences, Pakistan.
[2*]University of the Punjab, Lahore, Pakistan.
[3]Punjab University College of Pharmacy, University of the Punjab, Lahore, Pakistan.
[4]Centro de Investigación en Computación, Instituto Politécnico Nacional, CDMX, Mexico.
[5]PhD Student, Centro de Investigación en Computación, Instituto Politécnico Nacional, CDMX, Mexico.
*Corresponding Author: Sameen Siddiqi
*University of the Punjab, Lahore, Pakistan.

Abstract:
This study investigates the relationship between academic background (department and CGPA) and students' online learning readiness, self-regulated learning strategies, and technical competency in a university setting. While overall online learning readiness remained consistent across different academic backgrounds, significant variations emerged in specific learning approaches and technical skills. Students with lower CGPA demonstrated a greater reliance on task-oriented learning strategies, suggesting a need for tailored support in developing effective self-regulation skills. Additionally, a notable disparity in technical competency was observed between students from different academic departments, highlighting the potential influence of curriculum and prior technology exposure. These findings underscore the importance of recognizing the diverse needs and strengths of students from various academic backgrounds when designing and implementing online learning environments. Institutions should consider targeted interventions and support systems to ensure equitable access to technology and foster successful online learning experiences for all students.

Keywords: Online learning readiness, self-regulated learning, academic background, CGPA, technical competency, higher education, student success, online learning environments, educational technology.

1 Introduction

The terms "online learning", "e-learning" and "web-based learning" all involve using the Internet to facilitate learning from any location [1]. Online learning offers students the convenience of flexible scheduling and locations, which is beneficial for those who are unable to attend classes in person [2][3]. However, effective online learning is more than just teaching over the internet; it requires careful course design to improve learning outcomes and create a positive educational experience [4]. Additionally, online learning serves as a tool that shifts the teaching-learning dynamic to be more student-centered and adaptable [5]. Previous research has highlighted the advantages of online learning.

Keengwe and Kidd [6] noted that online learning environments incorporate diverse educational practices, often characterized by student-centered and active learning techniques. With sufficient motivation, students can access a wealth of information through both synchronous and asynchronous learning methods. Othman [7] discovered that shy students in traditional face-to-face classrooms were quite active and willing to participate in online settings. Therefore, teachers play a crucial role in fostering student engagement in online education. However, the responsibility for successful e-learning does not lie solely with the teachers; students must also adapt their online learning habits and behaviours [8]. Both teachers and students need to reconsider and adjust their roles in the context of online education [9]. Furthermore, for a successful online learning experience, students must maintain self-regulation and an active learning attitude throughout the learning process [10]. As the essence of online learning is to promote self-directed learning, students need to be more independent [11]. Compared to conventional education, students in online settings must have the ability to control, manage, and plan their learning behaviours—this process is known as self-regulated learning [12].

Self-regulated learning is an individual's ongoing effort and responsibility for their own learning [13]. Online learning requires students to be self-directed, making self-regulated learning crucial. This approach involves both self-efficacy, which is the belief in one's ability to succeed, and self-regulation, the process of setting goals and actively managing behaviours to achieve them [14]. Corno outlines four key phases of self-regulated learning: goal setting, organizing, self-monitoring, and self-evaluation [15]. Active learners, as described by Mou, embody this by taking ownership of their learning and employing metacognitive strategies to effectively manage their learning process [16]. Research highlights the importance of incorporating motivation, monitoring, feedback, reflection, and metacognition to foster student self-regulation. Motivation, beginning with goal setting, is paramount. It forms the foundation of self-regulated learning, guiding all subsequent planning and actions. Monitoring, encompassing both student self-monitoring and teacher monitoring, is crucial for raising awareness of the learning process. A learning diary, frequently employed in research, serves as a valuable tool for students to track and reflect on their learning journey [17][18][16]. Feedback, whether from instructors or peers, provides students with valuable insights into their work, allowing them to identify areas for improvement and strive for better results. This process of receiving and responding to feedback is a key element of self-regulated learning [19]. For self-regulated learning to truly flourish, reflection and metacognition are essential. Students who can critically evaluate their learning behaviours and cultivate an awareness of their own thinking are more likely to achieve academic success [20].

Learners' Readiness While often associated with early childhood education, it remains a crucial concept for university students. It encompasses a student's ability to acquire knowledge, adapt their learning behaviours, and ultimately achieve successful outcomes in their academic pursuits. For university students, readiness extends beyond simply engaging with coursework; it involves critical thinking, effective time management, and independent learning strategies. Factors that can hinder successful learning outcomes at the university level include mental health challenges, financial stress, lack of social support, and inadequate study habits.[21].

A key aspect of learner readiness is the disposition for learning, which includes a desire to learn, a positive attitude, willingness to invest time and effort, perseverance, and an understanding of learning's value [22]. Despite the term's imprecision, this disposition is linked to enduring behaviours, motivation, affect, values, and cognitive resources. Effective learners also need adequate cognitive functioning, a sufficient knowledge base, and good study skills [23]. However, meaningful learning requires favourable circumstances, such as personal well-being, geographic location, curriculum quality, and instruction quality.

The rapid evolution of online learning has transformed higher education, with synchronous technologies playing an increasingly vital role. However, the effectiveness of these technologies' hinges on student readiness and self-regulation, two critical factors influencing academic success in

virtual environments [24]. This study evaluates the impact of synchronous online learning technologies on university students' readiness and self-regulation, employing a computational and statistical analysis approach.

Core Questions of my study

1. What is the relationship between the use of synchronous online learning technologies and university students' online learning readiness?
2. How does the frequency and type of synchronous online learning technology use relate to students' self-regulated learning strategies?

Research Hypothesis

H1: There is no significant correlation between students' levels of online learning readiness and their levels of self-regulated learning.

H2: There is no significant difference in the mean scores of online learning readiness and self-regulated learning among students from different universities.

H3: There is no significant difference in the mean scores of online learning readiness and self-regulated learning among students from different academic departments.

H4: There is no significant relationship between students' CGPA and their scores on measures of online learning readiness.

By shedding light on this complex interplay, this research provides valuable insights for educators and institutions seeking to optimize online learning experiences and promote student success in the digital age. This paper will first delve into the relevant literature, followed by a detailed explanation of the study's methodology. The results of the computational and statistical analysis will then be presented and discussed, culminating in a discussion of the implications for both educational practice and future research endeavours.

2 Methodology

This chapter outlines the methodological framework employed to investigate the relationship between synchronous online learning technologies, student readiness, and self-regulated learning at the university level. It details the study's design, including the research paradigm, target population and sampling strategy, instrumentation and validation procedures, data collection methods, and the analytical techniques used to examine the collected data.

2.1 Research Design

This study aimed to examine the impact of synchronous online learning technologies on university students' readiness for online learning and their self-regulated learning behaviours. Given the need to measure and analyse the effects of these technologies, a quantitative research approach was adopted. A correlational research design was deemed most appropriate for investigating the potential associations between the use of synchronous online learning technologies, students' online learning readiness, and their self-regulated learning strategies. This quantitative approach allows for objective measurement, statistical analysis, and the potential for generalizing findings to a larger population of university students [25].

2.2 Population of the Study

A population, in research, encompasses the entire set of elements—be they individuals, objects, or events—that possess the specific characteristics defining the study's focus. In essence, it's the complete group to which the research findings are intended to apply [26].

2.3 Sample of the Study

This study concentrated on undergraduate students enrolled in general, public universities within the Lahore district Pakistan. To establish a representative sample, a multi-stage convenience sampling technique was employed. First, a comprehensive list of public general universities in the district was

created. From this list, two institutions, the University of the Punjab and Lahore College for Women University, were selected due to their accessibility and proximity, a hallmark of convenience sampling. Next, three distinct departments—Education, Pharm-D, and Computer Science—were chosen from within these universities to capture a range of academic disciplines. Finally, undergraduate students from each of these departments were recruited using convenience sampling until a sample size of 382 participants was achieved.

Table 1: Population of the study

Sr No.	Universities	Population	Sample Size
1.	University of the Punjab	45,678	211
2.	Lahore College For Women University	14,000	172
3.	Total	70,678	382

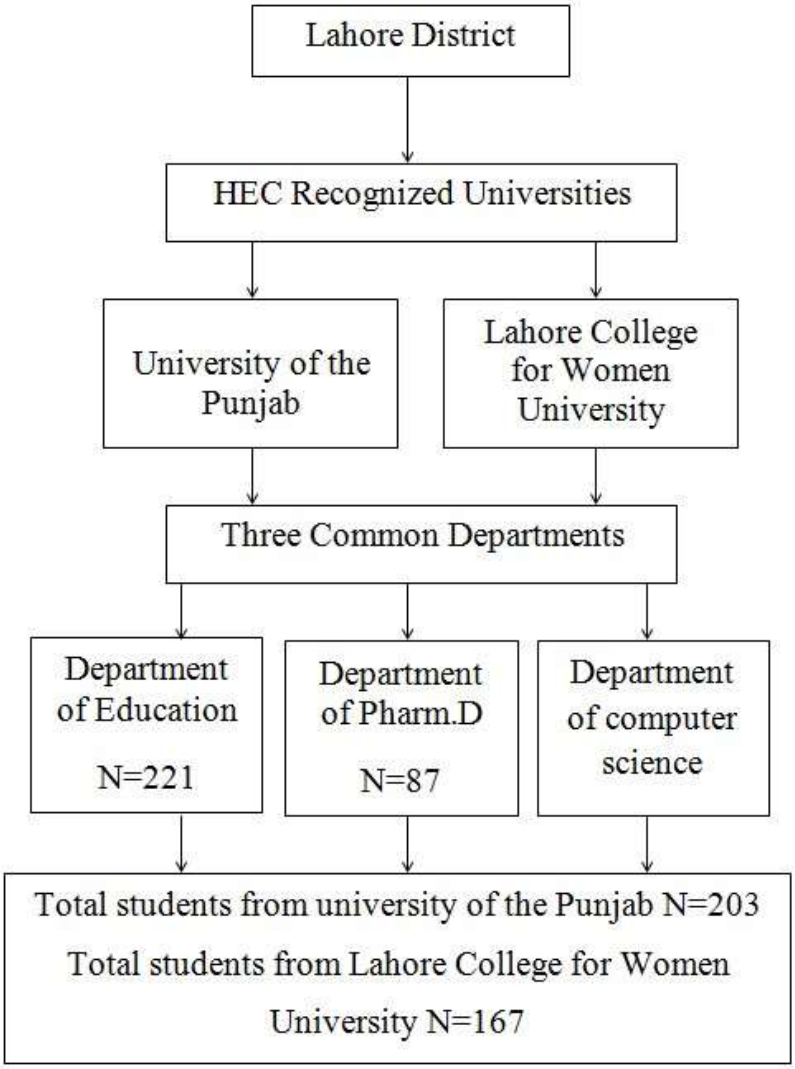

Figure 1: Sampling of study

2.4 Instrumentation

The study employed a three-part instrument to gather data. The first section collected demographic information, including university name, department, and previous semester CGPA. The second section, adapted from existing literature, measured students' online learning readiness across four factors: online student attributes, time management, communication, and technical competence. This 20-item section utilized a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The final section, also adapted from prior research, assessed self-regulated learning using a 24-item scale

developed by Barnard [27]. This scale, encompassing six factors (goal setting, environment structuring, task strategies, time management, help seeking, and self-evaluation), also employed a 5point Likert scale. Permission to use both instruments was obtained from the original authors via formal communication.

2.5 Piloting of study

To ensure the reliability of the adapted questionnaire, a pilot study was conducted with 65 undergraduate students from the University of the Punjab, Lahore. Cronbach's alpha, a widely recognized statistical measure of internal consistency, was employed to assess the reliability of the instrument.

2.6 Validity and Reliability of the Instrument

To ensure the instrument's validity, it was reviewed by three experts who provided feedback and suggestions. Following their recommendations, a pilot study was conducted with 65 students from both universities to assess the reliability of the two scales. The Cronbach's alpha coefficient, a measure of internal consistency, was calculated to be .86 for the overall instrument, indicating a high level of reliability and suitability for use in the main study.

2.7 Data Collection Procedure

Data collection for this study was conducted entirely online using Google Forms, ensuring efficient and convenient participation. To begin, the researcher obtained official permission from the Institute of Education and Research at the University of Punjab, lending credibility to the research endeavour. Following this, the researcher personally visited each participating university and met with the chairs of the selected departments. This step demonstrated respect for university protocols and allowed the researcher to clearly articulate the study's purpose and data collection procedures. Upon receiving consent from the department chairs, the researcher collaborated with department staff to identify and contact class representatives for each participating group of students. These representatives, acting as liaisons, then shared the secure Google Forms questionnaire link with potential participants in their respective classes. This multi-tiered approach ensured ethical data collection practices and maximized participation rates.

2.8 Data Analysis

To analyse the collected data, a two-pronged statistical approach was employed, utilizing both descriptive and inferential methods. Descriptive statistics, including mean, standard deviation, frequencies, and percentages, were calculated to provide a comprehensive overview of the sample characteristics and variable distributions. These calculations were likely performed using statistical software packages such as SPSS or R, known for their robust data handling and analysis capabilities. Beyond descriptive measures, inferential statistics were employed to uncover significant relationships and differences within the data. Independent sample t-tests were likely used to compare mean scores on online learning readiness and self-regulated learning between two distinct groups, such as students from different universities or departments. One-way analysis of variance may have been employed to examine potential differences across three or more groups. Finally, Pearson product-moment correlation coefficients were likely calculated to quantify the strength and direction of the linear relationship between online learning readiness and self-regulated learning. These inferential analyses, also likely conducted using SPSS or R, provided valuable insights into the complex interplay of factors influencing student success in online learning environments.

3 Result Analysis and Interpretation of Data

This study investigated the relationship between online learning readiness and self-regulated learning among university students in Lahore District, Pakistan, employing a quantitative approach grounded in computational data analysis. A total of 370 students from two universities participated, providing

a robust dataset for exploring this critical interplay. Data analysis was conducted using the Statistical Package for the Social Sciences version 15, a powerful software widely utilized in social science research for its ability to handle and analyse large datasets. Descriptive statistics, including mean and standard deviation, were computed to provide a clear picture of the central tendencies and variability within the sample's responses on online learning readiness and self-regulated learning measures.
To delve deeper into the relationship between these constructs, Pearson product-moment correlations were calculated, leveraging SPSS's correlation matrix capabilities to uncover the strength and direction of the linear association. Furthermore, independent sample t-tests and one-way analysis of variance were performed, employing SPSS's algorithms for comparing means across groups. These analyses allowed for the examination of potential differences in online learning readiness and self-regulated learning based on demographic factors or other relevant categorical variables, providing nuanced insights into the factors that may influence student success in digital learning environments.

Table 2: Descriptive Statistical Analysis

Reliability	**Cronbach's Alpha**	**No. of Items**
Online learning readiness	.8520	20
Self-regulatory learning	.90	24

The reliability analysis, using Cronbach's alpha, demonstrates that both the "Online Learning Readiness" (α = .85) and "Self-Regulatory Learning" (α = .90) scales demonstrate good internal consistency. These Cronbach's alpha values, exceeding .70, indicate that the items within each scale are reliably measuring their intended constructs. Therefore, the instrument exhibit's strong reliability for assessing these constructs within the study's context

Table 3: Description of the Demographic Variables (N=370)

Demographic Variables	**Frequency**	**Percentage** (%)
University Name		
University of the Punjab	203	54.9
Lahore college for women University	167	45.1
Department		
Pharm-D	87	23.5
Education	221	59.7
Computer Science	62	16.8
CGPA		
2-2.9	75	20.3
3-3.4	210	56.8
3.5-4	85	23.0

Table 3 presents the demographic characteristics of the 370 university students who participated in the study. Slightly over half of the participants (54.9%) were from the University of the Punjab, while the remaining 45.1% were from Lahore College for Women University. The sample represented three distinct departments: Pharm-D (23.5%), Education (59.7%), and Computer Science (16.8%). The largest proportion of students (56.8%) reported having a CGPA between 3.0 and 3.4, followed by those with a CGPA between 3.5 and 4.0 (23.0%) and those with a CGPA between 2.0 and 2.9 (20.3%). This distribution suggests a relatively high-achieving sample of university students.

Table 4: Descriptive Statistics and Levels of Online Learning Readiness and Self-Regulated Learning

Levels	**Low**	**Moderate**	**High**	**Mean**	**Std.**
Online learning readiness	114(30.8%)	173(46.8%)	83(22.4%)	3.66	.49
Self-Regulatory Learning	170(45.9%)	143(38.6%)	57(15.4%)	3.55	.55

Note: Low<3.50, Moderate= 3.50 to 4.0, High>4.0

Table 5: Mean Scores of Sub-Scales for Online Learning Readiness and Self-Regulated Learning

Sr No.	Factors	Mean	Std.
Students' Attitude Towards Online Education (N=5)			
1.	Students' Online learning readiness	3.66	0.49
2.	Online students' attributes	3.74	0.58
3.	Time management	3.64	0.62
4.	Communication	3.67	0.63
5.	Technology competency	3.58	0.48
Self-regulated Learning (N=7)			
1.	Self-Directed Learning	3.54	0.55
2.	Goal setting	3.51	0.74
3.	Environment structuring	3.84	0.70
4.	Task strategies	3.36	0.75
5.	Time management	3.28	0.80
6.	Help seeking	3.62	0.66
7.	Self-evaluation	3.59	0.65

Examining the mean scores of sub-scales for online learning readiness and self-regulated learning provides a more granular understanding of students' strengths and weaknesses in navigating digital learning environments. Within online learning readiness, while students exhibit confidence in their attributes as online learners (M = 3.74), their lower scores in technology competency (M = 3.58) reveal a potential vulnerability. This suggests that while students may be confident in their ability to adapt to online learning, they may require additional support in effectively utilizing digital tools and resources. Similarly, for self-regulated learning, the high score in environment structuring (M = 3.84) indicates students prioritize creating conducive learning spaces. However, the notably low score in time management (M = 3.28) exposes a critical area requiring attention. This disparity suggests that while students recognize the importance of a structured environment, they may struggle with effectively managing their time and meeting deadlines independently, a crucial skill in online learning. These findings underscore the need for interventions that not only enhance technological proficiency but also equip students with robust time management strategies to thrive in self-directed online learning settings.

Table 6: Pearson Product-Moment Correlation Coefficients Showing Relationships Between Online Learning Readiness, Its Sub-Scales, and Self-Regulated Learning Strategies Among Students

Sr No.	Variables	1	2	3	4	5	6	7	8	9	10	11	12
1.	Online readiness	-											
2.	Online students attributes	.801**	-										
3.	Time management	.811**	.643**	-									
4.	Communication	.795**	.432**	.476**	-								
5.	Technical competence	.818**	.528**	.485**	.638**	-							
6.	Self-Regulatory learning	.760**	.587**	.617**	.563**	.686**	-						
7.	Goal setting	.694**	.548**	.552**	.525**	.617**	.825**	-					
8.	Environment structuring	.600**	.560**	.497**	.3668*	.5228*	.667**	.479**	-				
9.	Task Strategies	.554**	.364**	.501**	.402**	.519**	.746**	.509**	.354**	-			
10.	Time management	.446**	.361**	.378**	.325**	.377**	.773**	.537**	.389**	.418**	-		
11.	Help seeking	.527**	.376**	.413**	.468**	.441**	.744**	.403**	.414**	.563**	.568**	-	
12.	Self evaluation	.605**	.437**	.443**	.455**	.623**	.812**	.630**	.405**	.563**	.561**	.574**	-

The correlation analysis reveals a pattern of strong positive relationships between online learning readiness, its sub-scales, and self-regulated learning strategies. Correlations ranging from .700 to .825 highlight the strong connection between overall online readiness and self-regulated learning, indicating that students well-prepared for online learning tend to possess strong self-regulation skills. Similarly, strong correlations are observed between online readiness and its sub-scales, such as online student attributes and time management, as well as within the sub-scales of self-regulated learning. Moderate positive correlations (r = .400 to .699) are also prevalent, suggesting meaningful but less strong connections between variables like communication skills and other aspects of online readiness and self-regulated learning. Weaker correlations (r below .400) are present as well, indicating that certain variables, such as environment structuring and help-seeking, might not be as closely related. These findings underscore the interconnected nature of online learning readiness, its sub-components, and self-regulated learning strategies, emphasizing the importance of fostering these skills in students to enhance their success in online learning environments.

Table 7: Comparing the Mean score of Online Learning Readiness and Self-Regulated learning Factors Between Students from University of the Punjab and LCW University

Sr No.	Factors	University of the Punjab (n=203)		LCW University (n=167)		Independent sample t-test	
		M	Std.	M	Std.	t-test	p-value
Students' online learning readiness							
1.	Online Students Attributes	3.73	0.61	3.76	0.54	-0.54	0.589
2.	Time Management	3.66	0.69	3.62	0.54	0.53	0.599
3.	Communication	3.63	0.73	3.72	0.49	-1.37	0.171
4.	Technical Competence	3.63	0.67	3.54	0.47	1.37	0.171
5.	Online Learning Readiness	3.66	0.58	3.66	0.36	-0.02	0.982
Self-Regulated learning							
6.	Goal Setting	3.49	.84	3.54	.592	-.669	.001
7.	Environment Structuring	3.86	.654	3.83	.767	.360	.033
8.	Task Strategy	3.44	.816	3.26	.649	2.343	0.007
9.	Time Management	3.33	.863	3.22	.717	1.287	0.187
10.	Help Seeking	3.62	.705	3.63	.594	-.147	0.118
11.	Self-Evaluation	3.55	.718	3.64	.570	-1.325	0.27
12.	Self-Regulated	3.55	.600	3.53	.476	.349	.074

A comparative study investigating online learning readiness and learning strategies among students from Punjab University (n=203) and LCW University (n=167) revealed intriguing differences. While both groups demonstrated similar levels of overall online learning readiness, self-perceived preparedness, goal setting, environment structuring, help-seeking, and self-regulated learning, significant variations emerged in specific areas.

Punjab University students exhibited a stronger preference for task strategies and time management techniques, while LCW University students reported higher self-evaluation scores and stronger communication skills. Conversely, Punjab University students demonstrated higher technical competence. These findings highlight how institutional environments might influence the development of specific learning approaches and skills despite comparable overall readiness for online learning.

Table 8: Comparing the Mean score of Online Learning Readiness and Self-Regulated learning Factors on the basis of Departments

Sr No. Factors	BSCS (N=62)		Pharm –D (N=87)		Education (N=221)		One-way ANOVA	
	M	Std.	M	Std.	M	Std.	F-value	p-value
Students' online learning readiness								
1. Online Students Attributes	3.83	0.53	3.72	0.59	3.73	0.59	.845	.430
2. Time Management	3.74	0.58	3.59	0.59	3.72	0.59	1.033	.357
3. Communication	3.62	0.65	3.64	0.63	3.81	0.42	1.753	.175
4. Technical Competence	3.62	0.71	3.65	0.65	3.67	0.63	5.099	.007
5. Online Learning Readiness	3.76	0.36	3.45	0.61	3.59	0.62	1.181	.308
Self-Regulated learning								
6. Goal Setting	3.46	0.71	3.50	0.70	3.53	0.77	.237	.789
7. Environment Structuring	4.02	0.52	3.80	0.80	3.82	0.71	2.124	.121
8. Task Strategy	3.41	0.67	3.36	0.74	3.35	0.78	.178	.837
9. Time Management	3.30	0.75	3.33	0.86	3.27	0.79	.172	.842
10. Help Seeking	3.70	0.51	3.72	0.77	3.57	0.64	2.048	.130
11. Self-Evaluation	3.53	0.61	3.61	0.74	3.60	0.64	.338	.714
12. Self-Regulated	3.58	0.41	3.56	0.61	3.53	0.56	.171	.843

This study examined the impact of academic department on both self-regulated learning strategies and online learning readiness among university students. The results showed no significant differences between departments in any of the self-regulated learning sub-scales (goal setting, environment structuring, task strategies, time management, help-seeking, self-evaluation, and overall self-regulation). This suggests that students across these disciplines tend to approach learning in similar ways. However, there was a significant difference in technical competence for online learning ($p = .007$), with the Education department exhibiting higher mean scores compared to BSCS and Pharm-D students. This difference highlights the potential influence of departmental demands and technological exposure on students perceived technical skills for online learning. Despite this difference, overall online learning readiness, as well as online student attributes, time management, and communication skills, showed no significant variation between departments.

Table 9: Comparing the Mean score of Online Learning Readiness and Self-Regulated learning Factors on the basis of CGPA

Sr No.	Factors	2-2.99 (N=75)		3-3.49 (N=210)		3.5-4 (N=85)		One-way ANOVA	
		M	Std.	M	Std.	M	Std.	F-value	p-value
1.	Online readiness	3.70	0.26	3.64	0.54	3.68	0.53	.512	.600
2.	Attributes	3.82	0.49	3.71	0.61	3.77	0.58	1.268	.283
3.	Time Management	3.70	0.49	3.62	0.67	3.64	0.63	.414	.661
4.	Communication	3.69	0.40	3.67	0.69	3.66	0.66	.024	.976
5.	Technical Competence	3.59	0.50	3.56	0.62	3.66	0.59	.928	.396
6.	Self-regulated	3.58	0.52	3.55	0.51	3.52	0.66	.280	.756
7.	Goal Setting	3.45	0.72	3.54	0.72	3.52	0.83	.423	.655
8.	Environment Structuring	3.72	0.58	3.90	0.66	3.83	0.88	1.853	.158
9.	Task Strategy	3.61	0.68	3.26	0.76	3.40	0.75	6.346	.002
10.	Time Management	3.36	0.72	3.33	0.81	3.11	0.84	2.850	.059
11.	Self-Evaluation	3.64	0.67	3.57	0.64	3.61	0.68	.329	.720

This study explored the relationship between students' CGPA and their online learning readiness, as well as their self-regulated learning strategies. Interestingly, while CGPA did not significantly predict overall online learning readiness, it did reveal differences in specific learning approaches. Students across all CGPA groups perceived themselves as similarly prepared for online learning and reported comparable levels of online skills, with a slight trend towards higher technical competence in the highest CGPA group. However, significant differences emerged in self-regulated learning. Students with lower CGPA (2-2.99) demonstrated a stronger preference for task strategies compared to their peers, while those with higher CGPA (3.5-4) reported significantly better time management skills. Additionally, students with mid-range CGPA (3-3.49) showed a preference for structured learning environments. These findings suggest that while overall online readiness might be consistent across CGPA levels, specific learning approaches and their effectiveness might differ, potentially influencing academic achievement.

Table 10: Significant Tukey Post Hoc Comparisons

Dependent Variables	Mean Difference	Std. Error	p-value
CGPA			
2-2.99	.34992(*)	.09946	.001
3-3.49			
Program			
BSCS			
Pharm-D	.30842(*)	.09672	.004

Post-hoc analysis following a one-way ANOVA revealed significant differences in specific learning strategies and technical competency based on both CGPA and academic program. Students with a lower CGPA (2-2.99) showed a significantly stronger preference for task-oriented learning strategies compared to those with a mid-range CGPA (3-3.49). This suggests that students facing academic challenges might rely more heavily on structured learning approaches. Additionally, BSCS students demonstrated significantly higher technical competency compared to Pharm-D students, indicating potential disparities in technological exposure and skills development between different academic programs.

4 Discussion

This study delved into the complex relationship between academic background, encompassing both academic department and CGPA, and its influence on online learning readiness and the adoption of self-regulated learning strategies among university students. Our findings paint a multifaceted picture, revealing areas of consistency as well as significant variations that warrant attention.

The consistent levels of overall online learning readiness observed across different academic departments and CGPA groups offer an encouraging starting point. This suggests that students, regardless of their academic background or current academic standing, generally perceive themselves as adequately prepared to engage with online learning environments. This finding speaks to the increasing prevalence and integration of technology in education, potentially fostering a certain level of digital literacy and comfort with online learning modalities across diverse student populations.

However, a deeper exploration of specific learning strategies and technical skills reveals a more nuanced story. The significant difference in technical competency between BSCS and Pharm-D students, with BSCS students reporting higher levels of confidence, highlights the potential impact of disciplinary demands and exposure to technology. It is plausible that the curriculum and learning activities within the BSCS program necessitate greater interaction with technology, leading to a more developed sense of technical mastery. This finding underscores the importance of recognizing that students do not enter the online learning environment as blank slates; their prior experiences and disciplinary backgrounds shape their skills and perceptions.

Furthermore, the observed differences in self-regulated learning strategies based on CGPA levels provide valuable insight into how students approach learning in online settings. The tendency for students with lower CGPA (2-2.99) to rely more heavily on task-oriented learning strategies compared to their peers with mid-range CGPA (3-3.49) suggests that those facing academic challenges might benefit from more structured learning approaches. This finding aligns with existing research (Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning, 2014) emphasizing the importance of providing tailored support to students who may struggle with self-regulated learning. It is crucial to recognize that academic performance is not solely a reflection of ability but can be influenced by a student's ability to effectively manage their learning process.

5 Conclusion

In conclusion, this study reveals that while overall online learning readiness appears consistent across diverse student groups, specific learning approaches and technical skills demonstrate significant variations based on academic department and CGPA. The lack of significant differences in overall online learning readiness across CGPA levels suggests that students, regardless of their academic performance, generally feel prepared for online learning. However, the observed differences in specific self-regulated learning strategies, particularly the reliance on task-oriented approaches among students with lower CGPA, highlight the need for targeted interventions to support these learners in developing more effective self-regulation skills. Additionally, the disparity in technical competency between BSCS and Pharm-D students underscores the importance of addressing potential gaps in technology access and training across different academic programs.

These findings hold significant implications for educators and institutions seeking to create inclusive and supportive online learning environments. By acknowledging the diverse needs and strengths of students, and by providing tailored support and resources, we can empower all learners to thrive in the digital age of education.

References

[1] Venera-Mihaela Cojocariu, Iulia Lazar, Valentin Nedeff, and Gabriel Lazar. Swot anlysis of e-learning educational services from the perspective of their beneficiaries. Procedia-Social and Behavioral Sciences, 116:1999–2003, 2014.

[2] David Tawei Ku and Chiung-Sui Chang. The effect of academic discipline and gender difference on taiwanese college students' learning styles and strategies in web-based learning environments. Turkish Online Journal of Educational Technology-TOJET, 10(3):265–272, 2011.

[3] Stefanie B Waschull. The online delivery of psychology courses: Attrition, performance, and evaluation. Teaching of Psychology, 28(2):143–147, 2001.

[4] Richard B Schultz and Michael N DeMers. Transitioning from emergency remote learning to deep online learning experiences in geography education. Journal of Geography, 119(5):142–146, 2020.
[5] Shivangi Dhawan. Online learning: A panacea in the time of covid-19 crisis. Journal of educational technology systems, 49(1):5–22, 2020.
[6] Jared Keengwe, Terry T Kidd, et al. Towards best practices in online learning and teaching in higher education. MERLOT Journal of Online Learning and Teaching, 6(2):533–541, 2010.
[7] Radiah Othman. Managing student and faculty expectations and the unexpected during the covid-19 lockdown: role transformation. Accounting Research Journal, 34(2):217–228, 2021.
[8] Julia Khanova. Moving courses online as a catalyst of pedagogical innovation: An activity theory-based view. Proceedings of the American Society for Information Science and Technology, 49(1):1–4, 2012.
[9] Faye P Wiesenberg and Elizabeth Stacey. Teaching philosophy: Moving from face-to-face to online classrooms. Canadian journal of university continuing education, 34(1), 2008.
[10] Chih-Hsuan Wang, David M Shannon, and Margaret E Ross. Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. Distance education, 34(3):302–323, 2013.
[11] Peter Serdyukov and R Hill. Flying with clipped wings: Are students independent in online college classes. Journal of Research in Innovative Teaching, 6(1):54–67, 2013.
[12] Lih-Juan ChanLin, Te-Lien Chou, and Wei-Hsiang Hung. Bridging volunteer services and mobile teaching in the tablet reading community. Libri, 65(4):269–280, 2015.
[13] Barry J Zimmerman. Dimensions of academic self-regulation: A conceptual framework for education. In Self-regulation of learning and performance, pages 3–21. Routledge, 2023.
[14] Albert Bandura et al. Social foundations of thought and action. Englewood Cliffs, NJ, 1986(23-28):2, 1986.
[15] Lyn Corno. Self-regulated learning: A volitional analysis. In Self-regulated learning and academic achievement: Theory, research, and practice, pages 111–141. Springer, 1989.
[16] Tsai-Yun Mou. Students' evaluation of their experiences with project-based learning in a 3d design class. The Asia-Pacific Education Researcher, 29(2):159–170, 2020.
[17] Charlotte Dignath-van Ewijk, Sabine Fabriz, and Gerhard Buttner. Fostering self-regulated learning among students by means of an electronic learning diary: A training experiment. Journal of Cognitive Education & Psychology, 14(1), 2015.
[18] Bernhard Schmitz and Julia Klug Michaela Schmidt. Assessing self-regulated learning using diary measures with university students. *Handbook of self-regulation of learning and performance*, pages 265–280. Routledge, 2011.
[19] David J Nicol and Debra Macfarlane-Dick. Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. Studies in higher education, 31(2):199–218, 2006.
[20] Samar Ghazal, Hosam Al-Samarraie, and Bianca Wright. A conceptualization of factors affecting collaborative knowledge building in online environments. Online Information Review, 44(1):62–89, 2020.
[21] Carol Copple et al. Learning readiness: Promising strategies. 1993.
[22] Simon Buckingham Shum and Ruth Deakin Crick. Learning dispositions and transferable competencies: pedagogy, modelling and learning analytics. In Proceedings of the 2nd international conference on learning analytics and knowledge, pages 92–101, 2012.
[23] LH Falik and R Feuerstein. Assessing internalized mediation in cognitive learning. International Journal of Cognitive Education and Medias Learning, 3 (1), pages 47–60, 1993.
[24] M Kamraju, J Krishnaiah, G Durgesham, Noor Shaba, Syeda Akhtar Begum, Nazneen Fatima, and Y Madhuri. Exploring the impact of online education on higher education. ASEAN Journal of Educational Research and Technology, 3(1):27–36, 2024.

[25] Xi Lin and Yan Dai. An exploratory study of the effect of online learning readiness on self-regulated learning. International Journal of Chinese Education, 11(2):2212585X221111938, 2022.
[26] Evodia Thato Masiloane. A comparison of qualitative and quantitative research: similarities and differences. PhD thesis, University of the Free State, 2008.
[27] Robert M Bernard*, Aaron Brauer, Philip C Abrami, and Mike Surkes. The development of a questionnaire for predicting online learning achievement. Distance education, 25(1):31–47, 2004.