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Exploring the Interrelationship between Student Readiness and Attitude toward Blended Learning: Evidence from Universities in Southern Punjab, Pakistan

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Abstract

Blended learning is increasing in higher education but the students in Southern Punjab are not enjoying the same exposure to technology and support. These have been noted to result in a gap in the knowledge of their preparedness to blended learning and how preparedness influences their attitudes. The research has been set to respond to the issue and investigate the key aspects of preparedness that affect the perceptions of learners. The primary goals were to evaluate technological, psychological, and infrastructural preparedness of students, investigate their attitudes, and identify the way these factors are interconnected. A survey was conducted in a cross-sectional form. The sample consisted of university students who were enrolled in blended courses at five institutions which were publics. Various types of readiness and attitudes were measured using a structured questionnaire. Data analysis was done using descriptive and inferential statistics. The findings have shown that students indicated a fairly good preparedness to blended learning and expressed a positive attitude towards it. The strongest effect was on their attitudes by their psychological preparedness. Also, essential roles were to be played by technological and infrastructural preparedness. These trends appeared in the sample, but there are slight gender differences. The Sciences and Technology students were found to be more prepared as compared to the Humanities students. These results indicate that motivation, digital skills, and stable institutional support play a significant role in influencing the acceptance of blended learning among students.

Key Words

Blended Learning, Student Readiness, Attitude, Technology Acceptance Model, Self-Determination Theory, Higher Education, Pakistan

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Introduction

The past ten years have seen a fundamental change in the landscape of higher education, which was highly increased with the development of technologies and caused by global crises such as the COVID-19 pandemic. It is against this changing educational ecosystem that the idea of blended learning, which refers to the purposeful combination of online and in-person elements of instruction (Lakhal & Hakimi, 2024), has come to be an intriguing

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and more widely embraced pedagogical paradigm in universities worldwide. Blended learning has the benefits of online learning and traditional classroom-based learning, which form meaningful interactions between the students, teachers, and learning resources (Yulia, 2017). This approach is flexible, user-friendly, and individualized learning experiences without compromising the interpersonal aspects that are essential in the development of the students.

As in most developing countries, the implementation of blended learning is an opportunity and a great challenge to higher education institutions in Pakistan. The swift development of information and communication technologies (ICTs) has opened up new possibilities in the delivery of education especially in areas such as Southern Punjab where there has been a long history of geographical and infrastructural barriers in the access of quality higher education. The Southern Punjab which includes Multan, Bahawalpur and Dera Ghazi Khan has a large number of students in both the public and private sector universities. Nonetheless, the simple access to technology and instructional design is not a guarantee of successful implementation. The studies continue to prove that the success of blended learning models strictly relies on the level of readiness of students and their attitudes to this type of learning (Abdullah et al., 2025).

Student preparedness is a complex set of skills, attitudes and environmental conditions. It goes beyond mere technological skills to encompass self-managed learning skills, metacognition, motivation, and the ability to move between asynchronous and synchronous learning environments (Bich et al., 2025). At the same time, the feelings of students towards blended learning, including their attitudes to the usefulness of the learning method, perceived ease of usage, and their feelings towards the online elements, strongly determine their engagement, persistence, and final learning results. These two constructs are not only additive but also interactive in their interrelationship; technologically adept students with negative perceptions toward online learning might not make full use of the resources available, whereas technologically adept students with positive perceptions might encounter difficulties when trying to implement the same.

Research Problem

Blended learning is a practice that is gaining popularity in the world, yet there is a problem of implementation in institutions in Southern Punjab, Pakistan. Among the critical problems, there is the absence of empirical knowledge about student preparedness in this region which is not the same as the rest of the world as it is involved in internet connection, financial constraints and student diversity. It is indicated that, although the connection between student preparedness and readiness to participate in blended learning is internationally correlated (Pregoner & Baguio, 2024), little is known about it in Pakistan. Also, there is no institutional preparedness and support to close these gaps (Qassim et al., 2024). The institutional support also has a moderating effect on student readiness and attitudes which should be further explored.

Needs of the Study

The research is dealing with essential theoretical, empirical, and practical requirements. Ideally, it seeks to build some region-specific models of adoption of educational technology in Southern Punjab taking into account local infrastructural, institutional, and student demographic variation. The available models (primarily founded on resource-abundant environments) cannot entirely be applied in this region. The paper also highlights the role of self-regulated learning as a major predictor of student readiness to engage in blended learning that has not been conceptually established among developing countries (Bich et al., 2025). The study in terms of its empirical value offers crucial background information on student preparedness and attitude in Southern Punjab, which is critical in the development of specific interventions. It also assesses the efficiency of the institutional support structures. In practical terms, the research provides educators and policymakers with practical recommendations based on evidence-based measures to target the enhancement of student preparedness, faculty training, and investments in infrastructure (Niaz et al., 2021b). This study is essential in making informed decisions and allocating resources in different learning institutions.

Specific Research Gaps Addressed

The topical theoretical, empirical, and practical needs are addressed by the current study. Theoretically, it will focus on coming up with region-specific models of educational technology adoption in Southern Punjab based on the local differences in infrastructure, institutions, and student demographics. The current models which are mostly resource-based environment models do not apply fully into this region. The paper also highlights the virtuous role of self-realized learning as one of the aspects of student readiness to blended learning, which has not been extensively examined in underdeveloped nations (Bich et al., 2025). Empirically, the study gives crucial groundwork information of student preparedness and attitudes in Southern Punjab, which may be important in the design of specific interventions. It also determines the efficiency of the institutional support structures. In practical terms, the research provides practical suggestions to teachers and policymakers with recommendations on evidence-based approaches to enhancing student readiness, faculty education, and investment in infrastructure (Niaz et al., 2021b). The study is important to make informed decisions and resource allocation at different levels of education.

Objectives of Study

- To establish the current level of preparedness among students to blended learning in Southern Punjab.
- To examine the attitude of the students towards blended learning.
- To test the interactions between the dimensions of readiness and attitudes of students.

Research Questions

- To what extent are students ready to take part in blended learning?
- What are the current attitudes of students towards blended learning?
- What is the effect of preparedness on the attitude of students in Southern Punjab universities?

Importance of the Study to the Context of the Southern Punjab

The Southern Punjab area with its diversity of socioeconomic backgrounds, degrees of digital infrastructure, and cultural specifics offers a very promising field to explore the adoption of blended learning. The existing studies have established that geographical variables, such as access to reliable internet connectivity, access to computing gadgets, the educational level of parents, and the capacity of institutions play a significant role in determining the readiness and the attitudes of students (Soomro et al., 2022). It has been reported that the quality of education and student satisfaction in higher education institutions in Southern Punjab are the spheres, which need to be investigated with particular attention (Hussain et al., 2024). Moreover, the research that has explored the perceptions teachers hold about the integration of technology in universities of Southern Punjab have found important gaps between institutional intentions and practical realities (Niaz et al., 2021b), indicating that the student-based perspectives are equally important to have multi-faceted knowledge.

Delimitations

This paper will be limited to a group of university students in blended learning programmes in five universities in Southern Punjab, which include The Islamia University of Bahawalpur, Bahauddin Zakariya University, Women University Multan, The University of Education (Multan Campus) and University of Sargodha (Sub-Campus). It did not involve the faculty, administrative personnel and institutional preparedness in evaluating the perception of the students. The research study adopted a cross-sectional survey design, which was followed by self-reporting data through structured questionnaires, thereby constraining the research study findings in terms of giving any indication of change which could be present in readiness or attitudes over time. In addition, convenience sampling is narrowed down to the chosen institutions only. Despite these shortcomings, the research provides a clear and bright picture of the connection between the willingness and inclination of students regarding blended learning in the resource-limited environment.

Literature Review

Blended Learning in Higher Education

Blended learning (BL) has also become a mainstream pedagogic paradigm in post-secondary education, which is purposeful in combining online and face-to-face delivery of instruction (Jnr., 2024). This modality is meant to capitalize on the benefits of each of these modalities, providing students with greater flexibility, access, and chances of interaction, and eventually maximizing the learning outcomes (Isteni, 2024). BL offers a dynamic structure that integrates conventional classroom learning with online media, interactive learning, and cooperative learning tools, therefore, promoting self-directed and active learning (Adigun et al., 2025). Empirical evidence around the world shows that blended learning is effective to a large degree, and it can result in increased levels of student satisfaction, better academic outcomes, and increased retention rates in comparison to either completely traditional or completely online learning experiences (Yu et al., 2022).

The perceived effectiveness of blended learning, however, is very dependent on a number of contextual factors. These are a strong institutional backing, sufficient technological infrastructure, and some degree of learner preparedness (Ali & Georgiou, 2024). The process of implementation in developing nations, including Pakistan, frequently faces serious obstacles associated with the lack of infrastructure, the lack of access to the internet, unstable electricity, and the lack of digital literacy of students and faculty (Akram et al., 2025). As an example, even though the faculty in Pakistan express positive views on blended learning, challenges like internet, network, and power supply are also key issues that must be addressed to implement it successfully (Qassim et al., 2024).

Student Readiness for Blended Learning

The readiness of students to blended learning is a multidimensional construct that includes the technological competence, psychological readiness, and the availability of infrastructural resources (Wakenshaw et al., 2024). Technological readiness describes the availability of the digital equipment and familiarity of the students with what they need, as well as the availability and stability of the Internet connection, and the ability to use online learning tools, such as Learning Management Systems (LMS) and collaborative software (Basbas, 2024). This aspect is essential because insufficient technology capabilities or access may directly hinder successful engagement in online aspects of blended learning (Geng et al., 2019). Indicatively, in Malaysia, research has discovered that though the students are usually good technologically, technology access and the ability to self-directed learning may differ (Abdullah et al., 2025). In the Philippines, even with the overall technological readiness, the problem of sporadic power interruption, as well as weak internet connectivity, are the important challenges (Tabisola et al., 2021).

Intrinsic motivation, the ability to use technology in academic activities, adaptability to various learning conditions, and confidence in the application of technology is psychological preparation (Alenezi, 2020; Firdaus et al., 2020). Higher degrees of self-efficacy and strong self-regulated learning (SRL) strategies result in better outcomes of the students in blended environments (Lobos et al., 2024; Luo & Zhou, 2024). It is also found that positive attitudes and motivation are key to the successful adoption of blended learning (Zhou et al., 2017). Conversely, the inadequacy of psychological readiness might cause frustration, dissociation and opposition to online learning tools, which in turn affect the effectiveness of learning in general (Ajam, 2015).

Students' Attitudes toward Blended Learning

The attitudes of students towards blended learning represent the beliefs, emotions, and intentions to behave in relation to its perceived usefulness, ease of use, and effectiveness (Jnr., 2024). The attitudes are dynamic, and they may cause great impact on motivation, persistence, and academic achievement in blended settings (Cao, 2023). When students feel that blended learning is achievable, positive, and supported, positive attitudes are often

developed, which increases the level of active interaction and self-efficacy (Radovan & Radovan, 2024). Such a positive attitude is often associated with positive learning (Ustun, 2019).

Attitudes are attributed to a number of factors among students. To illustrate, a study that compared the attitudes of blended and traditional courses revealed that exposure to blended learning has a positive potential to change the attitudes of students (Fenech et al., 2021). Nonetheless, there are other causes of negative attitudes, such as the insufficient support of the instructor (Bokovi et al., 2023), technical problems (AlAlami et al., 2021), information overload (Conrad et al., 2022), or a perceived deficiency with social presence in online elements (Cao et al., 2024). Negative attitudes towards blended learning can also be developed because of the challenges related to online learning, including the lack of reliability of technologies and the absence of social interaction (Jackson & Serenko, 2023). In most third world countries, such as Pakistan, although students tend to value the flexibility offered by blended learning, the presence of infrastructural and sociocultural barriers can greatly hinder the interaction and motivation process, therefore, leading to the development of poorer attitudes (S. Soomro et al., 2022).

Relationship between Readiness and Attitude

An increased amount of literature highlights the high level of interdependence between the student preparedness and their attitudes to blended learning, which is based on the fact that these two aspects of educational systems affect each other and determine the effectiveness of hybrid educational models (Ustun, 2019). Learners who are technologically proficient and psychologically motivated are more likely to consider blended learning to be effective and helpful, which further boosts their interest and performance (Kintu et al., 2017). It is a cyclical process: the preliminary preparedness will help to achieve positive attitudes, and the positive attitudes will support the further engagement and better results.

A low amount of readiness, expressed as insufficient digital competence, absent self-regulation abilities, or insufficient institutional support, may breed anxiety, disengagement, and learning technology resistance (Morton & Durandt, 2023). This can especially be seen in situations where students are pushed online without sufficient preparation and, thus, become stressed and less satisfied (Unger & Meiran, 2020). Such theoretical frameworks as the Technology Acceptance Model (TAM) (Porkodi et al., 2024) and Self-Determination Theory (SDT) (Fabriz et al., 2021) offer a solid foundation to comprehend this association. TAM assumes that perceived usefulness and perceived ease of use of a technology will be higher in readiness and thus, positive attitude towards technology adoption will arise. At the same time, SDT emphasizes that learners are more prepared to meet the intrinsic motivational need of autonomy, competence, and relatedness in the learning environment, which reinforces the positive attitude and engagement (Adigun et al., 2025). Therefore, students with the technical ability as well as the psychological desire have a higher chance of forming positive attitudes and maintaining active engagement in the blended learning conditions.

Research Methodology

Research Design

In this study, quantitative and cross-sectional survey design was used to study the interrelationship between student readiness and attitudes towards blended learning. The design was selected due to its ability to gather data about a large sample at one point in time and thus, analyzing the relationship between variables as they would exist in a population (Junus et al., 2023). Quantitative approach enables the measurement of constructs, statistical analysis of relationships and generalization of findings to a larger population within a given limit. The kind of data collected was consistent because the survey methodology used a structured questionnaire, which is essential in making reliable comparisons and applying inferential statistical tests. This is in line with the research that has been conducted on the perception and willingness of students in comparable educational settings (Abdullah et al., 2025; Basbas, 2024).

Population and Sample

This study had a target population of the five public-sector universities in Southern Punjab, Pakistan, where the study targets the university students taking blended learning courses. These were The Islamia University of Bahawalpur, Bahauddin Zakariya University, Women University Multan, University of Education (Multan Campus) and University of Sargodha (Sub-Campus). This research employed quantitative and cross-sectional design of surveys to examine the correlation between student preparedness and dispositions towards blended learning in universities of Southern Punjab. The sample was made up of students of five universities of the public sector and their selection was on convenience sampling. This number of participants was 350 students, which brought about a sufficient sample in terms of regression analyses. A structured and self-administered questionnaire was used in data collection which consisted of two parts: readiness and attitudes. Technological, psychological, and infrastructural factors were evaluated using the readiness section, which was based on the Online Learning Readiness Scale (Basbas, 2024). Perceived usefulness and motivation were measured with the attitude section that was developed on the basis of the Technology Acceptance Model (TAM) (Lee et al., 2003). Informed Consent was obtained and Ethical approval was received. The analysis of data was done in IBM SPSS and descriptive statistics, correlation analysis, multiple regression, t-tests, and ANOVA were used. The instrument was also reliable (Cronbachs alpha =.81-89). The research was conducted according to the ethical standards, with the study participant being confidential and their data being secure. The analysis method with rigorous approach offered helpful insights on the factors that affected the student preparedness and attitudes towards blended learning (Junus et al., 2023; Abdullah et al., 2025).

Data Analysis and Interpretation

This section officially introduces and discusses the statistical results of the analysis of 338 valid responses of students who served as a valid sample to explain the relationship between the readiness of students and their attitudes towards blended learning in Southern Punjab, Pakistan. Intense use of descriptive statistics, Pearson correlations, multiple regression analysis, and comparative tests (t-tests and ANOVA) made possible a thorough interpretation of data. The underlying assumptions of all these statistical procedures such as normality, homoscedasticity, and multicollinearity were checked to be met before interpretation (Cheng et al., 2023). Effect sizes were also computed to give information about the practical importance of the identified relationships and differences that complement the level of statistical significance.

Table 1

Descriptive Statistics for Readiness and Attitude

Variable	Mean	SD	Interpretation
Technological Readiness	3.61	0.82	Moderate
Psychological Readiness	3.74	0.69	High
Infrastructural Readiness	3.45	0.77	Moderate
Overall Readiness	3.60	0.72	Moderate–High
Attitude toward BL	3.80	0.75	Positive

Note: Scale anchors: 1 = Very Low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very High.

The descriptive analysis showed that overall readiness of the students of the university of Southern Punjab toward blended learning was moderately high with the mean of 3.60 (SD = 0.72). An additional analysis of the dimensions of readiness reveals that the Psychological Readiness became the highest rated one (M = 3.74, SD = 0.69). It implies that students were overall found to have high-confidence, intrinsic motivation, and self-regulation skills

required to navigate the context of online learning successfully (Adigun et al., 2025). On the other hand, Technological Readiness (M = 3.61, SD = 0.82) and Infrastructural Readiness (M = 3.45, SD = 0.77) were rated at moderate level. These average scores are consistent with the prior studies that show that there are still resource constraints in the developing areas that include irregular access to stable internet and restricted use of institutional digital resources (Akram et al., 2025; Farooq et al., 2020). Nevertheless, the average score of Attitude Toward Blended Learning was 3.80 (SD = 0.75), which means that students had a positive attitude toward blended learning in general and considered it an effective and convenient way of studying (Jnr., 2024).

Table 2

Correlations between Readiness and Attitude

Variable	r	P	Relationship
Technological × Attitude	.64	$p < .001$	Strong positive
Psychological × Attitude	.72	$p < .001$	Strong positive
Infrastructural × Attitude	.59	$p < .001$	Moderate positive

The Pearson correlation analysis which is summarized in Table 2 indicates that there are significant positive relationships between all three dimensions of the student readiness and their attitudes towards blended learning. The highest level of correlation was found between Psychological Readiness and Attitude (r =.72, p < .001). Such a strong connection highlights the importance of intrinsic motivation, self-confidence, and flexibility in influencing the positive attitude of students towards the blended learning (Adigun et al., 2025). When learners are more motivated and believe in their learning skills, they are more likely to form positive attitudes towards this strategy. Attitudes also had a strong positive relationship with Technological Readiness (r =.64, p <.001), which means that students with a higher level of digital access and digital literacy are more likely to have positive attitudes toward blended learning (Abdullah et al., 2025; Hamzah et al., 2021). Lastly, there was a moderate positive correlation, though not significant (r =.59, p <.001), between Infrastructural Readiness and others. This result supports the idea that the sufficient institutional backing and stable environmental infrastructure has a background role in developing positive learner attitudes towards blended learning (Ali et al., 2019). All these correlational results establish that the different aspects of readiness are encompassing facilitators of acceptance and satisfaction of the students in the blended learning settings.

Table 3

Regression Analysis Predicting Attitude

Predictor	β	T
p	Interpretation	Technological
.31	5.45	$p < .001$
Significant	Psychological	.42
7.22	$p < .001$	Significant
Infrastructural	.25	4.87
$p = .002$	Significant	Model Summary: $R^2 = .58$, $F(3, 346) = 159.8$, $p < .001$

Table 3 of multiple regression analysis shows that student readiness is a significant predictor of the attitude in blended learning. The model used to explain a significant 58% variance in attitudes (R2 = .58, F (3, 346) = 159.8, p <.001). Psychological Readiness proved to be the most powerful statistically significant predictor (b =.42, p <.001) among the dimensions of readiness, which highlights the supreme significance of motivational beliefs, self-efficacy, and self-regulation of students to develop positive attitudes to blended learning (Almulla, 2022). Technological Readiness turned out to be an important predictor as well (b =.31, p <.001), which shows that the digital

competence and access to the required tools are key factors when it comes to forming perceptions of students. In addition, Infrastructural Readiness showed a meaningful, although less important, predictive value (b =.25, p =.002). This means that institutional facilities and environmental support are not only available and good but play any significant role in shaping positive attitudes. The great explanatory power of the general model gives high empirical evidence to the theoretical frameworks including Technology Acceptance Model (TAM) (Porkodi et al., 2024) and Self-Determination Theory (SDT) (Fabriz et al., 2021), which suppose that intrinsic motivation, confidence, and perceived competence are the driving factors of technology acceptance and further participation in the learning environment.

Table 4

Gender Comparison (Independent Samples t-test)

Variable	Gender	Mean	SD	t
P	Effect size (d)	Technological Readiness	Male	3.70
0.79	2.35	.019	.28	Female
3.52	0.85	Psychological Readiness	Male	3.78
0.68	1.14	.257	—	Female
3.71	0.70	Attitude	Male	3.85
0.73	1.98	.048	.23	Female

The results of the independent samples t-test in Table 4 indicated that there were statistically significant, though insignificant differences in two important areas depending on the gender. Technological Readiness was also significantly higher among male students (M = 3.70, SD = 0.79) than among female students (M = 3.52, SD = 0.85), though the difference was not very large (t = 2.35, p =.019). The effect size (d =.28) suggests that it has a small practical difference. In the same manner, the male students expressed a slightly higher Attitude toward blended learning (M = 3.85, SD = 0.73) than female students (M = 3.74, SD = 0.77), and the difference is significant (t = 1.98, p =.048) and the effect size is small (d =.23). It is interesting to note that no statistically significant difference in Psychological Readiness was observed between genders (p = .257), and it can be concluded that male and female students were equally motivated and confident about their psychological readiness to blended learning. These results suggest that although the differences in gender in terms of access to technologies and attitudes remain, the motivation gap is also becoming smaller, possibly indicating the growing access of a larger group of students to technologies (Feroz, 2024; A. B. Soomro et al., 2020).

Table 5

Discipline-wise Differences (One-Way ANOVA with Tukey Post Hoc)

Variable	F	p	η^2	Post Hoc Result
Technological Readiness	4.26	.006	.04	Science & Technology > Humanities
Infrastructural Readiness	5.02	.003	.05	Business > Humanities
Attitude	3.74	.012	.03	Science & Technology > Humanities

According to the findings of one-way ANOVA as presented in Table 5, the results show significant differences between academic disciplines with regards to readiness and attitude towards blended learning. Science and Technology students were found to have a better Technological Readiness and better Attitudes than the Humanities (F (3, 346) = 4.26, p =.006, e2=.04 Technological Readiness; and F (3, 346) = 3.74, p=.012, e2=.03 Attitudes). Also, the Infrastructural Readiness of Business students was much greater as compared to Humanities students (F (3, 346) = 5.02, p =.003, e2 =.05). Although the effect sizes observed were moderate and small, the results indicate

that the academic discipline has a strong impact on the exposure to and use of digital tools and resources by students, which, in turn, affects their levels of readiness and attitudes (Cheng et al., 2023; Kanwal et al., 2022). This highlights that these differences are due to differences in the curriculum, pedagogical practices, and natural technological incorporation in various disciplines.

Table 6

Readiness and Academic Engagement

Readiness Dimension	Engagement Indicator	r	p
Technological	Participation	.58	$p < .001$
Psychological	Motivation	.73	$p < .001$
Infrastructural	Attendance	.46	$p = .001$

The correlation analysis, used and provided in Table 6, shows that all dimensions of readiness have positive and statistically significant positive correlations with different indicators of academic engagement. The Motivation was also strongly positively correlated with Psychological Readiness (r = .73, p <.001), which demonstrates that internal drive, self-efficacy, and confidence are the most important factors in maintaining active learning in blended settings (Geng et al., 2019). Participation was significantly and moderately related to Technological Readiness (r =.58, p <.001), which implies that digital competence and sufficient access to technology positively affect active participation of students in online elements and general blended learning activities (Santiago et al., 2021). Finally, Infrastructural Readiness showed a significant correlation with the Attendance (r =.46, p =.001), which means that the effective institutional support and stable learning environment play a crucial role in facilitating the consistent attendance and engagement of students in all blended modalities. All these findings prove that student preparedness is not merely a foreteller of favorable inclinations, but also a crucial facilitator of long-term academic participation and engagement in blended learning courses.

Findings and Discussion

This research was conducted in a rigorous study of the relationship that exists between the readiness and the attitudes of university students towards blended learning in Southern Punjab, Pakistan. The overall data analysis has proven that technological, psychological and infrastructural preparedness are central factors in influencing the perceptions of students and their interest in blended learning modalities. The results provide detailed data on spheres of strength, ongoing difficulties, and major disparities between different demographic and academic groups, which may serve as a strong empirical basis of specific interventions and policy-making.

Overall Readiness and Attitudes

The descriptive statistics showed that the general level of overall preparedness to the blended learning in Southern Punjab is moderate (M = 3.60, SD = 0.72) and that the attitude to the blended learning is mainly positive (M = 3.80, SD = 0.75). This optimistic attitude will be consistent with the world trends that indicate that students with a positive attitude towards blended learning are more than willing to use it because it is flexible and can positively impact learning (Nikolopoulou & Zacharis, 2023; Yu et al., 2022).

Further analysis of the sub-scales of readiness can help to identify certain areas of strength as well as areas that need to be addressed. The psychological readiness scored the greatest mean (M = 3.74, SD = 0.69), which shows that the students believe that they are generally confident, motivated, and able to regulate their learning in hybrid settings. This intrinsic drive and self-efficacy are vital in ensuring success in blended learning, whereby

learners are supposed to be more responsible towards their learning process (Adigun et al., 2025). Skills of self-directed learning are especially significant in non-traditional learning environments (Geng et al., 2019).

On the other hand, technological readiness (M = 3.61, SD = 0.82) and infrastructural readiness (M = 3.45, SD = 0.77) were rated as moderate. The presence of these moderate scores points to the persistent issues that exist in the developing countries, including irregular internet connectivity, the lack of access to high-tech devices and equipment, and the physical infrastructure or lack thereof (Akram et al., 2025; Farooq et al., 2020). Other developing settings have shown similar trends and have stressed that although the interest in digital learning is usually high, the practical obstacles may hinder its complete realization (Farooq et al., 2020; S. Soomro et al., 2022). Thus, even though students can be psychologically prepared to work with blended learning, they cannot completely engage because of the outside circumstances.

Relationship between Readiness and Attitudes

The correlation and regression results were good proofs of the interdependence of the readiness dimensions and attitudes to blended learning. The attitudes of students had a significant and positive correlation with all three dimensions of readiness, including technological, psychological, and infrastructural. The strongest predictor of attitudes was found to be psychological readiness (b =.42, p <.001) which captures a significant part of the variance. This highlights the fact that the internal conditions of students such as motivation, confidence, and adaptability form the basis of tolerance and appreciation of blended learning (Almulla, 2022).

Technological preparedness (b =.31, p <.001) and infrastructural preparedness (b =.25, p =.002) also had a significant predictive value and they collectively explained 58 percent of the variance in attitudes (R 2 =.58). Such a significant explanatory value supports the theoretical foundation of the Technology Acceptance Model (TAM) (Jnr., 2024) and Self-Determination Theory (SDT) (Fabriz et al., 2021). TAM implies that attitudes towards technology are directly correlated with perceived usefulness and ease of use which is often associated with technological competence and infrastructural support. SDT also expounds that the perceptions also satisfy lower level psychological needs of autonomy and competence, hence, resulting in intrinsic motivation and long-term involvement. Results are aligned with the existing international literature that identifies the complementary nature of individual digital competence and institutional support in the success of adopting the blended learning (Porkodi et al., 2024).

Gender Differences

The independent samples t-tests that were used in the gender-based analysis showed that there were slight but significant differences in technological readiness and attitudes. There was a slight difference in the technological readiness and more positive attitudes towards blended learning in male students. Nevertheless, the effect sizes were not very large (d =.28, technological readiness, d=.23, attitude) which means that although these differences are statistically significant, they may not have much practical importance. Notably, the gender gap in the psychological readiness did not differ significantly, which shows that both male and female students are equally motivated and sure about their capabilities to work with blended learning. This absence of difference concerning motivational factors indicates that although there used to be historical gendered digital divides, access and motivational exposure to technology might be coming together (Feroz, 2024; A. B. Soomro et al., 2022). The consistent though minor gaps in technological preparedness and disposition could be explained by the constant presence of societal or cultural forces influencing digital exposure and trust in the use of technologies among female students in certain areas.

Discipline-Based Differences

ANOVA showed that there were significant differences in the readiness and attitudes by academic disciplines. Science and Technology students were found to be more technologically prepared and had more positive attitudes towards blended learning than the Humanities students. On the same note, Business students indicated much greater infrastructural preparedness compared to the Humanities students. These results are consistent with the fact that disciplines in which a high degree of technological and digital dependence is inherent, including Science, Technology, and Business, should develop a greater degree of digital competence and more positive attitudes towards technology-enhanced learning (Cheng et al., 2023). The fact that small to moderate effect sizes (e2 of.03 to.05) suggest that these disciplinary differences exist, but they need focused strategies as opposed to non-selective, generalized strategies. These differences are probably caused by the curriculum design, exposure to digital tools, and the integration of technology into everyday academic activities, which necessitate discipline-specific support and training to achieve equitable blended learning in all disciplines (Su et al., 2024).

Readiness and Academic Engagement

As the correlation analysis in Table 6 shows, there are positive and statistically significant correlations between all dimensions of readiness and other indicators of academic engagement. The positive correlation between Psychological Readiness and Motivation was significantly strong ($r = .73$, $p < .001$), which illustrates that internal drive, self-efficacy, and confidence are crucial to preserving active learning in blended settings (Geng et al., 2019). Participation was significantly and moderately correlated with Technological Readiness ($r = .58$, $p < .001$), which implies that digital competence and sufficient access to technology positively affect active engagement of students in online elements and blended learning in general (Santiago et al., 2021). Finally, Infrastructural Readiness was strongly associated with Attendance ($r = .46$, $p = .001$), which suggests that consistent institutional support and a stable learning environment are indispensable to encourage the presence and engagement of students in all blended modalities. All these findings prove that student preparedness is not merely a forecasting aspect of positive mindsets but also a crucial facilitator of long-term academic participation and engagement in blended learning environments.

Conclusion and Recommendations

Conclusion

The paper has carefully examined the complex interdependence between university students' preparedness and their perceptions of blended learning in the context of the higher education in Southern Punjab, Pakistan. The overall analysis showed that, even in the conditions of widespread infrastructural and technological issues typical of the developing areas, the level of readiness and positive attitudes of students towards blended learning is rather positive.

One of the key findings was the overarching presence of psychological readiness- consisting of motivation, self-efficacy and self-regulation- as the strongest positive determinant of the student attitude towards blended learning. This highlights the importance of intrinsic motivation and belief in the process of making students involved in, or not in blended learning modalities. The other predictive likewise proved to be technological readiness, which is the digital competence of the students, and access to the necessary devices to demonstrate the relevance of functional digital skills. Besides, institutional resources and support mechanisms, which are associated with infrastructural readiness, served as a key facilitator, enabling a favorable environment in which blended learning could take place.

The research found out that there was a small but statistically significant gender difference, where male students were slightly more technologically prepared and expressed more positive attitudes. Nevertheless, the lack of gender difference in psychological preparedness indicates a positive trend of a reduction in motivational differences. Academic discipline on the other hand, was a more significant differentiator with students in the Science and Technology programs showing higher preparedness and more positive attitudes than their counterparts in the Humanities. There were also greater infrastructural preparedness of business students. These differences underscore the influence of curriculum-based adaptation of technology and predisposed exposure to digital technologies in some subjects on perceptions and readiness in learners. In essence, the preparedness of students was always associated with increased engagement and long-term motivation towards blended learning processes.

This study provided solid empirical evidence to the theoretical premises of the Technology Acceptance Model (TAM) (Jnr., 2024) and Self-Determination Theory (SDT) (Fabriz et al., 2021). It showed that effective implementation of blended learning is a dynamic process that depends on the interaction of technological capabilities of the students, their own motivational impetus, and the quality and accessibility of institutional support. The successful adoption of blended learning would thus require not only the consideration of the internal, person-specific (confidence and self-regulation) aspects but also the external, environmental (infrastructure and availability of digital resources) ones.

Recommendations

According to the sound conclusions made in this study, the following recommendations are suggested to make blended learning more effective, equitable and sustainable in universities in Southern Punjab, Pakistan, and other related developing environments:

Improve Technological Adequacy

Planned Digital Literacy Education: Introduce compulsory and continuous digital literacy education to students. It must not only provide basic computer skills but also skills that involve navigating various learning platforms, using collaborative online tools, critical thinking of online information, and mastering digital etiquette (Getenet et al., 2024).

Support Fair Access to Devices and Software: Universities must consider programs to offer subsidized or lent digital devices and the required software license to economically disadvantaged students. Digital divide could be addressed with the help of partnerships with technology providers and government programs (Tabisola et al., 2021).

Improving Psychological Preparedness

Develop Self-Regulation and Motivation Programs: Incorporate study skills programming, time management training and mentoring programs into the curriculum or as an extracurricular service. The specific areas of such programs are the development of self-regulation, the promotion of motivational beliefs, and the instillation of confidence in self-directed online learning (Geng et al., 2019; Lobos et al., 2024).

Provide Counseling and Wellness Services: Provide convenient access to counseling services that are directly aimed at managing technology-related anxiety, self-efficacy problems, and mental health challenges that may occur as a result of the requirements of blended learning (Alenezi, 2020). A supportive psychological environment can be promoted and student engagement can be improved greatly.

Enhance Infrastructure and Institutional Support

Provide Stable Internet and Systems: Invest in the high-speed internet infrastructure of the campus and make sure that Learning Management Systems (LMS) are stable and easy to use. It is necessary to maintain and update it regularly (Ali et al., 2019; Qassim et al., 2024).

Furnish Continuous Technical Support: Develop readily available and receptive technical support among students. This involves helpdesks, online guides and IT personnel specifically to solve technical problems in time to reduce frustration and lack of engagement (Jackson & Serenko, 2023).

Reduce Disciplinary and Gender Inequality

Discipline-specific Interventions: Build discipline specific blended learning and support systems and strategies where disciplines exhibit less technological and infrastructural preparedness (e.g., Humanities). It may include discipline-specific training in digital technology and incorporation of technology in contextually appropriate ways (Cheng et al., 2023).

Promote Fair Digital Resources Policies: Adopt policies that are both proactive and ensure equal access to digital learning resources and opportunities to all students, irrespective of gender. This will deal with the implicit biases and will make sure that students get to experience similar background digital experiences.

Policy and Strategic Integration

Align with National Educational Frameworks: Make sure blended learning programs are in line with national educational policies and quality assurance models so that they can promote standardization, distribution of resources, and sustainability.

Ongoing Evaluation of Preparedness and Disposition: Develop regular, periodic measures of student preparedness and disposition regarding blended learning. The information obtained out of these evaluations must directly guide the curriculum planning process and faculty professional development initiative and resource distribution decisions to maintain a responsive and reactive system of education.

Future Research Directions

1. **Longitudinal Studies:** Use longitudinal research to monitor the trends in student readiness and attitudes over a long period of time and get an insight into how it changed and what the long-term effect of a blended learning experience would be.
2. **Examine Institutional-Level Factors:** Test institutional-level factors further, such as faculty preparedness, pedagogical preparation, and curriculum implementation and its contributions to overall blended learning efficacy. This provides a comprehensive perspective on the adoption of blended learning.
3. **Effectiveness of Interventions:** Does research to assess the effectiveness of specific interventions to improve psychological and technological preparedness to operate in resource-starved settings to present evidence-based methods of overcoming the long-standing difficulties.
4. **Qualitative Exploration:** Use qualitative studies to complement quantitative studies (e.g., focus groups, interviews) to better understand what students went through, what their perceptions of blended learning environments are, and what subtle challenges exist in them.

Summary

The success of blended learning depends on the existence of a strong synergy of psychological empowerment, technological competence, and a strong institutional support. Higher education institutions located in Southern Punjab can achieve more inclusive, interactive, and ultimately effective blended learning conditions by first identifying and dealing with the internal (psychological) and external (technological and infrastructural) readiness factors. Such organizational activities are essential in ensuring a fair participation, high levels of student satisfaction, and learning outcomes among heterogeneous student bodies in the dynamic context of 21st century learning.

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