

RESEARCH ARTICLE

## Post-Pandemic Learning Recovery: Assessing the Effectiveness of Hybrid and Blended Learning Models in Pakistani Universities

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**Abstract:** The COVID-19 pandemic compelled universities worldwide, including those in Pakistan, to shift rapidly from conventional classrooms to online and hybrid modes of instruction. This transition reshaped teaching and learning practices, accelerated the adoption of digital platforms, and highlighted major disparities in access, readiness, and digital capability. While blended learning has shown promise in strengthening engagement, improving learning outcomes, and building essential digital skills, concerns remain regarding its fairness and effectiveness across diverse student groups. In Pakistan, initiatives such as LMS development, PERN, and the National Knowledge Bank supported continuity of learning, yet gaps in connectivity, device availability, and digital literacy—particularly among rural, low-income, and female students—revealed persistent inequalities. Existing local studies largely emphasize perceptions and readiness rather than measurable effects on performance, inclusion, and technological competence. This study aims to evaluate the impact of hybrid and blended learning in Pakistani universities during the post-pandemic period. It examines three core outcomes: academic performance, digital literacy, and inclusion. Using a mixed-methods approach, the research compares blended and traditional learning environments across multiple provinces and institutions. Quantitative data from academic records, surveys, and LMS analytics will be complemented by qualitative insights from interviews and focus groups with students and faculty. The study further investigates institutional and pedagogical factors that influence blended learning success. The expected findings will offer evidence on how blended learning contributes to learning recovery, reduces educational disparities, and strengthens digital readiness. The results will guide universities and policymakers in developing more resilient, equitable, and technology-driven models for higher education in Pakistan.

**Keywords:** Perceived Parental Negligence, Social Media Addiction, Social Isolation, Adolescents

### Introduction

#### Background

The COVID-19 pandemic has caused enormous transformation to the world education sector considering the fact that the higher organs of learning were left with no choice but to convert into home learning and online education in vast numbers. It substituted the conventional classroom training with the online and the virtual varieties term as well, it also forced teachers and learners to be resourceful and innovative in how they relate, assess and interact with each other. This accelerated the development of blended and hybrid types of learning one that entails instructor-based pedagogy and use of technology agreement (Internet or technological) (Dhawan, 2020; Hodges et al., 2020).

The model post-pandemic has seen universities around the globe operate hybrid systems, to gain greater flexibility and sustainability in the system of education, improve authenticity, and revitalize inform the existing innovations in education (Zhao, 2022). Researchers also find that, perfectly designed blended learning creates an affirmative reaction on educational accomplishment, the growth of a feeling of agency

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in the joints and an increment in satisfaction among the learners compared with standard and classroom learning (Lopez et al., 2021; Boelens et al., 2022). In addition to that, blended formats may establish the digital numbers and teamwork functions which are needed in the 21 st century to make use of employability (Means et al., 2020; Rahman and Wulandari, 2023).

Higher Education Commission (HEC) initiated four programs in Pakistan to allow shaping the digital equipment of education, creating learning management systems (LMS), Pakistan Education and Research Network (PERN), and the National Knowledge Bank at the Pakistani universities (Zhang, 2024). This was an effort that the attacked distance and hybrid educating through lockdowns (Rafi et al., 2021). Nevertheless, the pandemic has proven the implicit differences in the availability of apparatuses, unlimited internet connectivity, and preparationness of educators (Baber, 2021). Quite a number of students particularly of low-income and rural was massively digitally illiterate and this tainted the learning unit and experience. This has been one of the places where the teaching approaches that are inclusive, quality and sustaining have been restructured as the post-pandemic phase has been cautious recovery (Arshad and Malik, 2022).

It is also assumed that the MI can serve as a possible long-term stabilizer to the Pakistan higher education to make it flexible, scalable, and more cost-effective (Khan et al., 2023). They can, however, be discussed in terms of creativity in consideration of their performance with respect to academic and digital skills, and their existence and inclusion in heterogeneous learning conditions. It is thus fundamental to use evidence based empirical research to discuss the same in policy and practice.

### **Rationale**

The reason why the proposed research is justified is that the problem of the feasibility of hybrid and blended learning in the real world and its fairness is critical in the context of education recovery after the pandemic. Widening the gaps in access that already existed in education, pandemic in particular enlightened the developing states, like Pakistan; the digital divide is a significant phenomenon (Mahmood, 2021). On the one hand, the new modalities, which the online provided, continued to move privilege, although other practices were establishing new privileges at the margins of marginalized, including female students and colonial borders.

The research has demonstrated empirically that, despite the lack of access equity and quality gap in blended learning, it has the capability to address these limitations via an interweaving of the merits of the conventional learning environment and the online delivery model (Singh et al., 2022). It is also adaptively paced and it is self-regulated as well as it gives continuous feedback through the digital platform. It can also allow building digital literacy, potentially one of the most significant capabilities that will require not only the students but also the creators of education to have in the post-COVID economy (Ali and Khalid, 2023).

Most of the studies conducted in Pakistan, however, have investigated the perceptions or readiness to engage in blended learning, as opposed to measure the effects on the learning outcomes and the inclusion (Kanwal et al., 2023). Without the analysis of evidences, the universities will introduce the frameworks that will be unable to react to the loss of learning or cause additional unfairness. Thus, the research will develop evidence-based research that has potential effects on institutional policy, professional training and development interventions, and national policy initiatives, which enhance the endeavors to develop resilient, inclusive, and technologically adaptive education.

### **Problem Statement**

Even though the hybrid and blended learning model is increasingly becoming popular within Pakistani universities, there is low rhetoric on the research studies conducted on the model in improving academic performance, defining digital literacy and how fairly the concept can be accessed (Sain et al., 2023). The response time of the pandemic with no lasting framework of pedagogy and sufficient evaluating mechanisms

was associated with blended practices that were prevalent in most institutions. This has created such loopholes in the knowledge of the following:

1. The actual comparison between blended learning and the traditional classroom training in terms of its impacts on the learning success of the students.
2. The extent of allowing or disabling digital illiteracy among students and faculty with the presence of integrated modalities.
3. Whether they result in inclusion and availability of disadvantaged populations, such as those in the rural areas, low-income earners, and people discriminated due to gender differences.

Absence of comprehensive evaluation deprives the policymakers and institutions the opportunity to do what they rightfully should in teaching recovery after the pandemic. Accordingly, to ensure that the advent of the digital transformation will lead to educational equality rather than marginalization, a systematic and evidence-based assessment procedure of the academic, technological, and social meanings of blended learning should be provided.

### **Aim**

The aim of this research is to evaluate the effectiveness of hybrid and blended learning models in Pakistani universities following the COVID-19 pandemic, with particular attention to their impact on academic performance, digital literacy, and inclusion.

### **Research Objectives**

This study seeks to achieve the following objectives:

1. To assess the relationship between blended learning and academic performance among university students in Pakistan.
2. To evaluate how participation in blended learning influences students' digital literacy and technological competence.
3. To examine the inclusivity and accessibility of blended learning environments, focusing on gender, socioeconomic, and regional disparities.
4. To identify institutional and pedagogical factors that contribute to the success or failure of blended learning implementations.
5. To develop policy recommendations and practical strategies for improving blended learning adoption and effectiveness in Pakistani higher education.

### **Research Questions**

The study will address the following research questions:

1. How do blended and hybrid learning models affect students' academic performance in Pakistani universities?
2. What is the impact of blended learning on students' digital literacy and technological engagement?
3. In what ways do blended learning models promote or hinder inclusion and equitable access for diverse student populations?
4. What pedagogical and technological factors contribute to the effectiveness of blended learning in post-pandemic Pakistan?
5. How can evidence from this study inform educational policy and institutional strategies for digital transformation?

### **Hypotheses**

Based on the literature and theoretical framework, the following hypotheses are proposed:

**H1:** Students engaged in blended learning environments exhibit higher academic performance than those in traditional classroom settings.

**H2:** Blended learning participation significantly improves students' digital literacy and confidence in using educational technologies.

**H3:** Properly implemented blended learning reduces educational inequality by enhancing inclusion for rural, female, and economically disadvantaged students.

**H4:** The effectiveness of blended learning is positively associated with the quality of instructional design, digital infrastructure, and faculty training.

## Literature Review

### Conceptualizations and Evolution of Blended and Hybrid Learning

It is somewhat wide-ranged and is called a planned fusion of online learning events with face-to-face delivery the notion of blended learning (or hybrid learning). Over the years scholars have blue-eyed typologies (e.g. rotation, flex, a la carte, enriched virtual) although they are more inclined to emphasize the fact that e-learning effectiveness depends on the pedagogical integration and not the technology itself (Graham, 2013; Halverson et al., 2017). The present-day analyses have helped to understand that blended learning is not a homogeneity concept; it is majorly composed of a variety of combinations between synchronous/asynchronous, scaffolding approaches, and digitalanalog interaction (Soh, Gunawan and Gu, 2023). In an even more recent review of the literature on blended learning, despite identifying the unsustainable benefits of blended learning as the aspects of engagement, autonomy, and flexibility, the model contains a larger set of systemic problems including equitable access, faculty proficiency, and course design (the Instructional Design Paradox) (Soh et al., 2025).

At the same time the literature has been continued to develop further to investigate the dimensions of learning engagement (behavioral, emotional, cognitive) and the attractiveness the perspectives to varying tastes apply to blended environments. The research on the hierarchy-based blended learning model found out that the cognitive and emotional engagement roles were stronger than the mere behavioral ones, including the number of logged ins (Ye et al., 2023). It states that the experiences of learners and how they perceive both digital / face-off modalities play role in blended learning environment as compared to the existence of participation.

### Effects of Blended Learning on Academic Performance and Outcomes

Most empirical research reports ever done and a large variety of settings indicate that blended learning has a positive effect on academic performance but that it is not very extensive and is not very rigorous (Rayyan et al., 2024). A recent meta-analysis, comparison between blended and online-only mode demonstrates medial-positive effect (standardized mean difference = 0.611) whereby by comparison, fully online delivery behavior is likely to unfold worse than blended learning (Yu et al., 2025). This conforms to findings that modalities may significantly be mixed to provide a more profound scaffolding, more loops and active assistance in comparison to the entirely online case.

However, all research does not offer equally good results. The learners, when applied to a group of students, yielded universal benefits of a blended learning setting that are compromised due to structural shortcomings of faculty training, infrastructure, and the support provided by the institution, especially low self-regulation abilities needed (Müller et al., 2023). Other researchers also warn that any existing disparity will be exacerbated by a bad blended course since the more individually inclined digitally competent learners will gain other students at a disadvantage (Sarkar, 2023).

Also, the means of student performance in blended courses have gotten easier to modeling: in one of multimodal data fusion literature which utilized LMS log data, forum posts, quiz results and in-class attendance results, the use of en bloc of multiple data streams was found quite successful in modeling the final outcomes (Conijn et al., 2016). Moodle quiz performance, the degree of engagement of forum, and levels

of lectures were the most appropriate predictors (Chango, Cerezo & Romero, 2024). Between the lines, it only means that the effectiveness of blended learning has no connection with one measure, but a set of various engagement patterns concerning different modalities.

### **Blended Learning and Student Engagement, Motivation, and Digital Literacy**

Blended designs also have the potential to influence engagement and motivation or grades other than grades. One ON study conducted in a quasi-experimental and teachers college in Ethiopia has generated high results that learners attending a teaching setting with mixture in form of a hybrid had significantly more engagement with post-test learning than within a more traditional setting that implied the integration of a mix. The literature review on the results of motivation is broader because blended learning has the benefit of fostering the learner autonomy, self-efficacy and intrinsic motivation, but the fact that it does remain dependent on the quality of the learning design, feedback, and support (Rafiola et al., 2020).

Closely interrelated is that of digital literacy or digital competence. Digital skills (examples: ability to search, judge, and produce content) on the behalf of the students in blended learning environments have been gradually addressing in other empirical researches (Wahyuddin et al., 2024). In a quasi-experimental study involved personally, comparing the online-only level with the blended teaching with inserting the activities conducted in Nigeria, it was proved that the latter, but not the former, the examples of teaching with the digital literacy development achieved greater performance not only in domain knowledge, but also digital literacy improvement (Onwuagboke, Nwakamma & Umune, 2025). In a study in Morocco, the digital course in the domain of higher education was mentioned when the digital literacy of the participants was significantly promoted by the digital approach to learning with special references to the information evaluation and content creating areas (El Messaoudi, 2024).

According to the research conducted in recent years, it is important to notice that the digital literacy does not only ease the process of interaction but also can mediate the school performance. In a Chinese study, it was determined that to a limited extent, digital literacy indirectly, but directly predicted to academic achievement via the mentalities of learning adaptability and online, self-regulated learning. In other words, more digitally competent students adapt more effectively to the blended conditions, regulate their learning process and show improved academic achievements (Chen et al., 2025). Another examination on the relationship between blended learning and performance showed that digital literacy and learning adaptability are the mediating variables between the two variables (Wu and Yuan, 2023).

Another study also fulfilled the role the level of digital literacy as a determinant of English language performance of college students and presented the results, according to which the promotion of the academic performance along with the participation in collaborative online activities possessed the effect of the latter (Zhang et al., 2025). The findings of these authors argue the notion that digital literacy is not a mere covariant, an activity, but a difference maker when it comes to success in blended environments.

### **Adoption, Readiness, and Moderating Factors**

In spite of the provided facts by various researches, implementation of the blended learning process highly depends on the institutional, instructor and student preparedness. One of the insightful categories of influence such as technological infrastructural preparedness, perceived usefulness, social influence (norms), facilitative conditions (e.g. technical support), and perceived ease of use and observed were on a research over the factors that influence diffusion of blended learning in Karachi, Pakistan. The authors indicated that even though the faculty demonstrated an interest, there is no support and incentives, which tend to influence the adoption (Awan, Butt & Khan, 2024).

The following important problems were cited by the empirical literature used in Pakistan: the problem of digital inequities (the lack of broadband, devices), inadvertence or hostile attitude of faculty to technology,

the imbalance in the pedagogical preparation process, and institutional resistance. A qualitative examination of blended learning in Pakistan institutions of higher learning resultantly revealed barriers to innovation as cultural biasness towards teacher-centered education, lack of trust in the proficiency of technologies by Muslim students, and institutional support (Akhtar et al., 2024).

As per the case study of Challenges and Successes of Blended Learning in the directorate of distance education of international Islamic University Islamabad (IIUI), the flexibility and increased access was highly appreciated by the students but the faculty reported the lack of motivation, technology, support and training. Technical issues, inability to deliver and patchy content proved to be exasperating the blended experience, as well as the inability to reply to questions by the students (Jumani, Malik and Akram, 2018).

According to this recent extensive review, the potential of blended learning is constrained by triple digit divide (without access of people (digitally-un-skilled) and equity (not designed inclusively). The blended deployments present a threat to the improvement of current disparity without enacting remedial acts to all the three (Soh et al., 2025).

Besides, the situation also concerns another matter: sometimes, institutions in a rural or under-resourced setting with a worse connectivity system, fewer devices to share, and tend to be less knowledgeable about the LMS infrastructure. Many studies caution about applying blended modalities in totality regardless of the particular situation, which is likely to make the underprivileged students more disadvantageous (Kandis, 2025; Akhtar et al., 2024).

### **Gaps in the Literature and Justification for This Study**

This still poses some gaps despite the fact that existing body of research appears to be expanding with specific interests in recovery achieved after the pandemic, equity and higher education within a low-middle income setting of the type of Pakistan. Firstly, related literature available in the Pakistani language, concerns mostly description (or content) rather than experimental or quasi-experimental research that would have allowed making a plausible estimate of the performance or digital literacy causal impact. Kanwal, Zahid, and Afzal (2023) are an example as they have carried out a survey about the faculty about advantages and obstacles without relating them to actual results.

Second, existing literature presents minimal studies which tabulate heterogeneous impacts in implementing blended learning that is, whether the benefits of blended learning are evenly distributed among gender (or better uniformly showing any variations), socioeconomic status, and rural/urban status or first generation students. Reportedly, there exist warnings that the more progressive learners are the one who will experience more advantage however this is minimal external systematic, context sensitive evidence on which this statement can be grounded (Kandis, 2025).

Third, the contribution of local contexts as to mechanisms and mediators (e.g. digital literacy, learning flexibilism, self-regulated learning, teaching presence) are ill-studied. Mediation chain may be advanced based on the evidence of international scholars (Chen et al., 2025; Wu and Yuan, 2023), but, in Pakistani situations, it may be contrasting to moderate constraints (e.g. connectivity, language, culture).

Fourth, multi institutional, cross-disciplinary labor is not voluminous. The scholarly research would tend to be just restricted to one particular department or one university; restricted perspective in comparing the differences between the public/privates, geographical areas of interest, and course of type. This restricts the application of policies in an external manner.

Finally, there is much existing research which is pre-pandemic or emergency remote research, and not deliberate blended research during an early post-pandemic recovery. The teaching-learning relationship in the recovery mode has been altered differently: students may have suffered a loss in learning, feeling of



loss of motivation, and lack of digital skills, which had developed an effect on the effectiveness and equality of the blended formats.

Therefore, the discrepancy between the theory and the empirical research might also be bridged successfully under the proposed research: to undertake rigorous comparative evaluation of the hybrid/blended models of several Pakistani universities, to measure the outcome (performance, digital literacy, and inclusion), and to deconstruct the research design features and intermediaries could be associated with certain gaps. It can inform receptive and fair responses to the policies in the aftermath period of the pandemic.

## **Methodology**

### **Research Design**

The paper will be founded on convergent mixed method research to evaluate the applicability of hybrid and blended learning models in Pakistani universities in the post-surge phase of study. Mixed-method approach refers to quantitative and qualitative data aggregating with the purpose of having more of the whole picture of the relations between academic performance, digital literacy and inclusion. The quantitative component participates in the research of the measure learning outcomes as well as the statistical relationships but the qualitative one researches the perceptions, experiences and circumstantial factors in effecting the blended learning. It also allows triangulation of results as well as the greater internal validity (Creswell and Plano Clark, 2018).

It is a quasi-experimental design as it considered as comparable the cross-sectional information on the universities that embraced the blended learning and the universities that continued predominantly with the traditional face to face training. This design is not unreasonable since it can enable carrying out the comparison across modalities and taking into consideration the variation in the context such as the level of institutional preparedness, faculty capacity levels or the level of student demographics. The quantitative and qualitative approach to the study gives the vision of the most measurable and the human dimension of learning recovery in the Pakistani context in the sector of higher learning.

### **Research Population and Sampling**

Undergraduate students and faculty members, as well as the university in Pakistan and the private university, will form the target population since 2021 and implemented the models of blended learning or hybrid learning. The sample of the study takes into consideration the various universities in Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan as one method of sampling through different geographic, socio-economic and even the technological environment. This fact that several provinces are included allows to study a digital difference between regional directions on the background of access to resources and pedagogical types.

Multi stage sampling is employed to sample the institutions and the participants. The selection of the university at the first level is being done at the deliberate level based on the aspects of policy blended learning implementation verified in the form of HEC documents or institutional web pages. In the second stage, stratified sampling would be used such as the integration of both private and public institutions. The departments in the selected university that conduct blended courses will be identified and students will be sampled randomly to provide the diversity in terms of gender, course and course year. In the study, the population of approximately 6000 students and 200 teachers in 8-10 universities will be sufficient to determine whether or not the study will have the statistical power of analyzing multilevel.

### **Data Collection Methods**

Various methods that would measure academic, digital and social-behavioral constructs of effectiveness of blended learning will be used in data collection. The quantitative data are obtained with the help of three primary sources, which are institutional academic records, (2) structured questionnaires, and (3) learning

management system (LMS) learning analytics. Academic records contain a uniform content on the grades, passing/failing rates, and participation of a student as well as the comparison of the results of the evaluation performance made in blended classes and traditional classes. Such objective measures of engagement such as the frequency of logins, performing assignments and posting in online forums can be offered by LMS analytics.

The questionnaire has predetermined questions arranged in a questionnaire form to assess the digital literacy, satisfaction with learning, self-efficacy, and feeling of inclusion among the students. The questionnaire will be grounded on the validated scales such as the DigComp 2.2 Framework of digital competence commonly used by the European Commission (Vuorikari et al., 2022) and the Community of Inquiry framework with its teaching and its cognitive presence (Garrison et al., 2000). Parallelogram instructor survey Survey used to assist in enlisting details on preparedness in instruction alongside technological dexterity and beliefs on the effectiveness of blended learning. To be brought to the fore reliably and effectively, the two tools are pilot-tested using a small sample of students and college staff.

The information obtained through use of semi structured interviews and focus groups is in the form of a qualitative information. They provide more detailed details on the experience, the challenges, and methods that relate to participant-hybrid instruction. Student focus groups determine the inclusiveness, accessibility, and attention of students, whereas the faculty interviews allow finding out the pedagogy and assessment design as well as getting the support of the institution. Any meeting is recorded in tape and transcribed word by word and then translated to English where and when necessary in an attempt to bring about an appropriate thematic analysis.

### **Data Analysis Procedures**

Quantitative data analysis results are presented on the basis of the descriptive and inferential statistics in order to measure the correlation between outcome and learning modality variables. The summary of such demographic characteristics as academic performance characteristics, and level of digital literacy is provided in descriptive statistics. The inferential analyses are based on multilevel regression modeling principles to address hierarchical data designs (course-then students within universities). The learning modality (blended and face-to-face) will be considered as the main independent variable, and the academic performance (successful learning results) will constitute the dependent variables (second).

The matching i.e. propensity score matching (PSM) is done to match up the covariates of the groups that involve the past GPA, the gender of the person and the degree of incomes and the internet access. The study also adopts the difference-in-differences (DiD) analysis in the institutions that introduced blended learning slowly and compared the provided results provided before and after the implementation. The statistical study is carried out through SPSS and R, the p-value is determined to be below 0.05.

The qualitative data analysis in NVivo software is conducted thematically and follows the six processes of the model of Braun and Clarke (2019) familiarization, coding, theme generation, reviewing, defining, and reporting the data. The codes would be published out of inductivity of the data available and deductively of theoretical configurations as CoI and TPACK (Technological Pedagogical Content Knowledge). The linearizing effects between quantitative and qualitative results lead to the enhanced degree of reliability and produce an enhanced conception of the mechanisms of observed patterns.

### **Validity and Reliability**

Various tricks will ensure consistency and soundness of the results. The validity of the instruments also depends on an expert examination by an educator researcher as well as the HEC policymakers to determine relevance of the content. Construct validity is questioned using construct/ survey scale and item ratings



through confirmatory factor analysis (CFA) which involved instruments regarding the latent constructions digital literacy and inclusion. Reliability is tested using cronagh alpha in which the value must be over 0.70, therefore, to be agreeable.

In order to counter 1the effect of confounding, the study antagonizes confounding confusing PSM and fixed-effects modeling that eliminates the impact of blended learning on institutional and personal characteristics. Cross-regional sampling will assist in supporting the external validity because it will add more relatability to the various institutions of higher learning in Pakistan, which are heterogeneous. The aspect of triangulation of data between surveys (between surveys between LMS data and interviews) is one of the triangulating data which creates credibility whereas the peer debriefing and the member checking is an instrument employed to guarantee the interpretative correctness of the qualitative analysis.

### **Ethical Considerations**

The study is concerned with compliance in ethics. All the united universities have the institutions of review boards (IRB) that have approved data collection. After this, they are given an information sheet which expounds the use of the study and they make voluntary participation on the study and the confidentiality promise besides being given the later withdrawal privilege and not being punished. Informed consent is obtained before the survey general completion or participation in an interview.

The personal information is anonymised through the switching of the participants with the use of their codes, and description is placed on an encrypted system in order to prevent any breaches of confidentiality issues. Identifying information is removed and pseudonymized quotes used in the writing of interview material. The research abides by the rules of beneficence, respect of autonomy and upholding justice as found offered by the American Educational Research Association (AERA, 2020). Special attention has been drawn to ensure that the female and rural students become equal participants in that their voices are not as well represented in the higher education research in Pakistan.

### **Limitations of the Methodology**

The mixed-methods design makes the research more comprehensive, but has certain pitfalls. The confounders are not measured even with the use of PSM, the quasi-experimental nature does not have to nullify the confounders. The quality of the data available in various universities might not be the same due to the differences in the sophistication of LMS and record systems. Other than this, self reported digital literacy information may also bias answers. The cross-sectional approach cannot apply causal inferences through time; this is the reason why longitudinal research needs to be conducted in the future to reexamine the findings of learning and acquisition of skills semester-by-semester.

### **Expected Outcomes**

The study is expected to suggest that blended and hybrid learning model can significantly contribute to academic performance, digitization literacy and generalisation of direct study of the Pakistani based students pursuing courses in the university as compared to the conventional classroom teaching method. It is also predictable that the ability of students to think critically, to solve problems, to cooperate will be organized during the blended course programmes because interaction will be enhanced and learning facilities will not be attached to one. In the quantitative analysis, it is possible to anticipate allocating a specific change in grades, involvement, and digital competence, but in the qualitative analysis, a greater follow-up result among learner autonomy and satisfaction is anticipated to be achieved. In addition, the study will be a success and will assist in the creation of the demographic disparity in the influences since convenient design answer, such as ready to use materials, flexible testing, and tutor assistance will enable decrease in the educational disparity between female, rural, and low-income students. The study will provide factual information on how

hybrid education will contribute to recovery of post-pandemic learning and long-term educational survival through discovering the pedagogical and technological factors that facilitate these interactions.

### **Significance of the Study**

This study is significant because this might be added to the idea of reformation of education in Pakistan and digitalization in a higher field of education. It provides timely data sourcing of the potential of the blended learning of sustainable study of academic of recuperating, capacity making and inclusiveness in the post-COVID years. The findings will be incorporated in the national and institutional policies that are formulated in the course of the Higher Education Commission(HEC) and the university administrations concerning the technology integration, training of the faculty staff and the investment in the infrastructure. Moreover, the paper assists in addressing the research gap already present due to the fact that it gives a quantitative and qualitative perspective of effectiveness of blended learning in the real world especially in developing world with digital equity as an issue. It also contributes academically to the existing literature on technology-based learning by modern situating in contextual theories on global organizations such as Community of inquiry (CoI) and TPACK to the context of Pak society-cultural setting. Practically speaking, it will allow teachers and policy makers to actualize or develop between formidable learning locales with what is referred to as student-centered learning that encourage an equitable access, a student-centric learning which is lifelong, and digital empowerment as chief strands in assisting the alignment of the Pakistan Vision 2030 education and innovation goals.

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