



From Access to Employability: A Mixed-Methods Evaluation of Hybrid Technical Education and Student Placement Outcomes in Pakistan

Muqaddas Malik¹, Dr. Muhammad Adnan Maqbool², Dr. Tahira Bibi³

¹M.Phil. in Distance and Non-Formal Education, Allama Iqbal Open University (AIOU), Islamabad

²Assistant Professor of Education, University of Education Lahore, Attock Campus, Pakistan

³Assistant Professor, Department of Distance and Non-Formal Education, Allama Iqbal Open University, Islamabad, Pakistan.

ARTICLE INFO

Article History:

Received: May 14, 2026
Revised: June 09, 2026
Accepted: June 21, 2026
Available Online: June 26, 2026

Keywords:

Hybrid Education, Employability, Technical Education, Mixed-Methods Research, Student Placement, Skill Development, Pakistan

Corresponding Author:

Dr. Muhammad Adnan Maqbool

Email:

adnan.maqbool@ue.edu.pk

DOI: <https://doi.org/10.59075/tamsaal.v4i6.122>



ABSTRACT

Pakistan is among the worst hit countries in the world with more than 26 million children out of school, which is the biggest impediment to human capital development and economic growth. To address this, alternative education models, such as hybrid and accelerated technical education, have been developed to fill the gap between education and the job market. In this study, a mixed method approach is followed to determine the effectiveness of such models, the Middle Tech Program of Allama Iqbal Open University (AIOU) (in collaboration with The Japan International Cooperation Agency (JICA)) is taken as a case study. The qualitative part of the study is conducted based on a case study approach, which is guided by the Kirkpatrick Model and the Constructivist Learning Theory with the application of semi-structured interviews, observation and document analysis on 29 different stakeholders. To complement this, the quantitative part involves studying a large data set to find the necessary variables that could predict employability such as CGPA, coding ability, internship and project experience in MATLAB. The findings also reveal that there are systemic problems of implementation, such as the lack of teachers' training, the weakness of digital infrastructure, the delay of learning materials, and the gap between the skills taught in the vocational education system and the skills needed by the labour market. The quantitative findings confirm the academic and technical and practical experiences as good predictors of employability. Qualitative and quantitative results show that hybrid education can make a positive contribution to access and engagement of learners, but needs structural changes, more industry involvement and more skill-oriented education to improve employability. The study concludes with policy, institutional and research recommendations to improve the Hybrid education systems in Pakistan.

© 2026 The Authors, Published by ULLR. This is an Open Access Article under the Creative Common Attribution ([CC-BY 4.0](#))

Introduction

Education is an important catalyst of socio-economic development, social mobility and the development of the nation. However, good education is still out of reach in the underdeveloped

countries such as Pakistan. Despite the provisions of the Constitution under the Article 25-A and international commitments made under SDG 4 (Quality Education), Pakistan still reports high dropout rates, low enrolment and a poor educational outcome. The size of the out-of-school children (OOSC) problem is of particular concern. Pakistan has the highest number of children out of school (OOSC) among all countries with more than 26 million OOSC children. This exclusion is not only a limitation on opportunities for some people, but it also affects the country's workforce and the vitality of the long-term economy. The limitations of poverty, gender inequality, geographical isolation and the poor infrastructure have not helped cure this problem in the traditional schooling system. Therefore, alternative and flexible education models are required which can reach the marginalized and the excluded from the traditional education models.

A blended approach of face-to-face and distance learning and vocational education has been found to be acceptable. Other programs, such as Middle Tech, are intended to offer students marketable training and skills, and academic information. A two-way focus in a world where technical skills and experience are increasingly important in the job market. But there is no guarantee that these programs are effective. They can access but require systematic and rigorous assessment to be able to transfer learning to work. In this context, this study combines qualitative information on the implementation of the programs with quantitative information on placement outcomes, providing a holistic picture of the education-employment nexus in the unique context of Pakistan.

Literature Review

School Attendance and Dropouts in Pakistan's Education System

Structural inequalities, governance problems and under investment factors have been identified as major concerns in the overall education system of Pakistan which further lead to failure in the provision of quality and equitable education. The constitutional provisions of Article 25-A, which provides for Free and Compulsory Education till age of 16, are not always provided at the provincial level (Government of Pakistan, 2023). The low investment of public funds in education is one of the bigger issues. Historically, the total amount of expenditure has been less than 2% of GDP which is below the UNESCO recommended amount of 4-6% (UNESCO, 2024). This chronic underfunding has resulted in inadequate school infrastructure, severe teacher shortage, overcrowding of classrooms and inadequate teaching-learning materials. Basic infrastructure, such as access to electricity, clean drinking water and sanitation, is lacking in many rural and remote schools, and this impacts school attendance and retention (UNICEF, 2023). Regional variations contribute to these challenges. This indicates inequitable distribution and uneven development of resources between Balochistan and Sindh, as well as between Punjab and Khyber Pakhtunkhwa with higher rates of OOC in Balochistan and Sindh (Pakistan Institute of Education, 2024). The inequalities are not only geographic, but also socio-economic, as the disadvantaged people who live in marginalized areas are faced with cumulative disadvantage in education. Gender inequality is a great obstacle. Access to school is hindered for girls due to their cultural norms, early marriage, and household responsibilities and safety concerns (UNICEF, 2023). The study further indicates that girls' education is not given the same degree of attention as boys', in particular in poorer households, another factor that helps to create a gender gap (Aslam & Kingdon, 2011).

Governance issues like accountability and political instability, as well as the lack of good policy implementation have hindered reform. The main problem of poor learning outcomes is the teacher's absence, inadequate professional development and obsolete curriculum (World Bank, 2022). All these inefficiencies in the system contribute to the environment in which it is very hard for students to remain in school and thus a high drop-out rate. Overall, Pakistan's education system is plagued by a combination of structural, socio-cultural, and economic challenges that hinder access and quality, and therefore alternative learning models like hybrid and accelerated learning become not just desirable but necessary.

Dropout Dynamics and Socioeconomic Constraints

The problem of dropouts is a complex one in Pakistan and is linked to economic, social, institutional and environmental factors. Of this poverty is the most predominant determinant. Poor financial performance in families can lead to families prioritizing immediate cash over education (Akram, 2024). Children are frequently recruited into child labour, instead of going to school, to earn money for the household. Another key driver of pushing students out is curriculum irrelevance. The traditional education systems focus on learning theoretical knowledge and have little relation to practice and work. This disconnection affects students' motivation, because they are not aware of the economic value of education (Baloch et al., 2023). The issue is exacerbated by cultural and gender issues. Some of the factors that limit girls' mobility across many communities, particularly in rural areas include social norms, early marriage, safety and mobility. These can result in a substantial gender gap in dropouts, with girls being more likely than boys to drop out of school (UNICEF, 2023).

The dropout dynamics are further worsened by institutional factors. Quality of teaching is not good, pupil motivation is low to remain at school and school systems are very rigid. Administrative challenges such as the need for documentation like birth certificates or B-forms (Pakistan Institute of Education, 2024) are some of the major reasons for many children not enrolling or staying in school. Environmental issues such as floods, and negative climatic changes have also impacted schooling in Pakistan. Climate-related events disrupt education continuity, especially vulnerable groups are affected, and infrastructure is damaged, displacing communities (Save the Children, 2024). All these are indicators of a major problem: Education does not always provide clear and immediate tangible economic returns, and so does not appeal to less privileged groups. This underscores the importance of education system strengthening to create a more holistic approach to education with learning outcomes linked to livelihoods for retention and employability.

Hybrid and Accelerated Learning Models

Hybrid and Accelerated Learning Programs (ALPs) are new methods that overcome the problems and weaknesses of the traditional education system particularly in low attendance and high drop-out schools. The purpose of ALPs is to offer the learners a condensed curriculum that can enable them to achieve more than one grade level within a shorter timeframe, supporting them to re-enter formal education or enter directly into the workforce (UNESCO, 2024). These programs and vocational training offer academic development and skills training. The integration is particularly significant in countries like Pakistan, where there is a significant gap between what is taught in schools and the demand for such skills in the job market (Gohar et al., 2023). Hybrid learning models support accessibility through the use of a blend of learning delivery

models: face-to-face, distance, digital and print. This agility helps learners to overcome geographical, financial and social constraints. In remote locations, for instance, a student can learn from a digital resource or from printed materials, requiring less use of physical school facilities (Moore & Kearsley, 2012).

When done well, empirical research indicates that blending models provide benefits to student engagement, retention, and learning (Means et al., 2013). But there are key considerations that will determine whether or not they are successful: teacher preparation in pedagogical and technological skills; availability of devices and internet connection, as well as learning materials; monitoring and evaluation systems for continuous assessment; and labour market alignment, where skills taught align with the jobs available. If these enabling factors are not present, hybrid programs can fail to succeed or to be maintained. They have tremendous potential, but need proper planning and institutional support for implementation.

The Constructivist Learning Theory in Hybrid Education

Piaget (1972) and Vygotsky (1978) developed constructivist learning theory that is a good base for hybrid technical education. This theory assumes that learning takes place when the learner actively builds knowledge based on the interaction with the surrounding, rather than passively receiving knowledge. In hybrid technical programs, constructivism is manifested in the training of technical skills, problem-based learning, group work, and real-world practices. These methods can help students learn more about the subject and build transferable skills, which are important for employment (Jonassen, 1999). Vygotsky's theory of the Zone of Proximal Development (ZPD) is a theory that focuses on guided learning and social interaction. For hybrid learning, facilitators are key to providing scaffolding for learning experiences, and guiding students from low to high levels of skill application.

But the success of constructivist approach relies on the competence of teacher in student-centered approach, the availability of learning resources, supportive learning environment that provides the opportunity for the students to be experimented. In developing countries such as Pakistan, these conditions are not completely fulfilled. Lack of training for teachers and resources for institutions to support experiential learning (Gohar et al., 2023). Nevertheless, constructivist concepts are very pertinent, especially for vocational education in which learning-by-doing is not just desirable but a necessity.

Employability and Human Capital Development

In today's education systems, employability is a focal point, especially with the challenges of global economic competition and fast technological development. It is no longer enough for students to be knowledgeable academically, they need to be able to be flexible, use their skills, and problem solve (Yorke, 2006). Human capital theory states that education increases the productivity of individuals and in turn, their potential earnings by building up their skills and competencies (Becker, 1993). But, the success of education in enhancing employment opportunities largely hinges on the extent to which it is relevant to the labour market.

The research reveals that employability is dependent on various factors such as academic performance (CGPA), technical skills (coding, IT skills), soft skills (communication skills, team work) and practical experience (internships, projects). The ability to transfer the theoretical

knowledge into real life situations is becoming more important (Harvey, 2001). This has resulted in more practical learning opportunities like industry connections, internships and project-based learning. Employment-education gap is huge in Pakistan. High unemployment rates among educated youth (World Bank, 2022) as many graduates do not have the skills needed by employers. From this perspective, the hybrid technical education programs have been developed by including both the academic curriculum and training in skills which would enhance their employability in a meaningful and measurable manner.

Evaluation Framework: The Kirkpatrick Model

Kirkpatrick Model (1994) has a detailed model of how to measure the effectiveness of education and training, consisting of four stages: (1) Reaction Participants' satisfaction and involvement, (2) Learning Knowledge and skills acquired, (3) Behavior Application of knowledge and skills in real situations, (4) Results Overall impact and results. It is particularly relevant for hybrid and vocational programs as it can be measured from many perspectives, such as how they are perceived by the learner at start of program vs how they are experienced in the job. The Kirkpatrick Model is used in this study to structure the analysis of the Middle Tech Program by looking at stakeholder perceptions (Reaction), skill development (Learning), practical application (Behavior), and employability outcomes (Results). The study is a combination of this with a constructivist theory and a quantitative placement analysis, providing a comprehensive evaluation of the process and the outcome of hybrid technical education.

Methodology

Research Design

The research design for this study is mixed method research which combines qualitative and quantitative method to gain a deeper understanding of the role of hybrid technical education and its effect on employability outcomes. The justification for this is to benefit from both methodologies: qualitative data provides depth in the experiences of the stakeholders and the difficulties in implementation and quantitative data provides measurable evidence of the factors affecting students' placement. It is a convergent parallel design, where the qualitative and quantitative data are collected and analyzed separately and merged at the time of interpretation. This approach enables triangulation and strengthens findings and validity (Creswell & Plano Clark, 2018).

Qualitative Methodology

Participants

For the qualitative component, a purposive sample was used consisting of 29 stakeholders who were directly involved with Middle Tech Program implementation. To achieve a comprehensive understanding, participants included 4 Administrators (Directors and Deputy Directors), 5 Tutors/Academic Instructors, 7 Students (program beneficiaries), 2 Technical Skill Trainers, 4 Program Coordinators, 3 Supporting Staff (administrative/dispatch/examination), 2 Technology/LMS Experts and 2 JICA Representatives. This diversity allowed for policy, implementation, and beneficiary voices to be represented.

Data Collection Methods

There were three main approaches used:

Semi-Structured Interviews. Interviews were used to elicit experiences, perceptions, and challenges of stakeholders. The duration of each session was roughly 25-45 minutes and included a protocol on the following topics: teaching and learning processes, use of digital platform and effectiveness, availability and quality of learning materials, effectiveness of vocational training, administrative and coordination issues, and assessment practices. All the interviews were conducted with informed consent and audio-recorded for accuracy.

Observations. Non-participant observations were made at workshop sessions, technical training classes, tutorial sessions, and access to LMS. Classroom environment, availability of resources, student engagement, practical skill implementation and teacher-student interaction were assessed by an observational checklist.

Document Analysis. Program documents were analyzed and used to support and validate findings including: curriculum guidelines, learning modules (both print and digital), LMS usage reports, admission records, training manuals, and examination policies. This triangulation added to the credibility and trustworthiness of the study.

Data Analysis

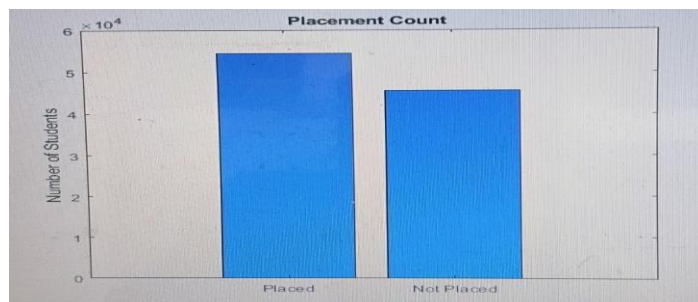
Thematic analysis was used in accordance with Braun and Clarke (2006) to analyse the qualitative data. The process was repeated reading to familiarize with data, initial coding of meaningful segments, identification of themes across data, refinement of themes and review, and interpretation and development of narrative. Themes were then aligned with the Kirkpatrick Model to enable analysis at the Reaction, Learning, Behavior and Results Levels.

Quantitative Methodology

Dataset Description

The quantitative part used a data sample of 60,000 student records, which was a statistically significant sample for analysis. The set of important variables included in the data set were academic achievement, technical skills and employment outcomes.

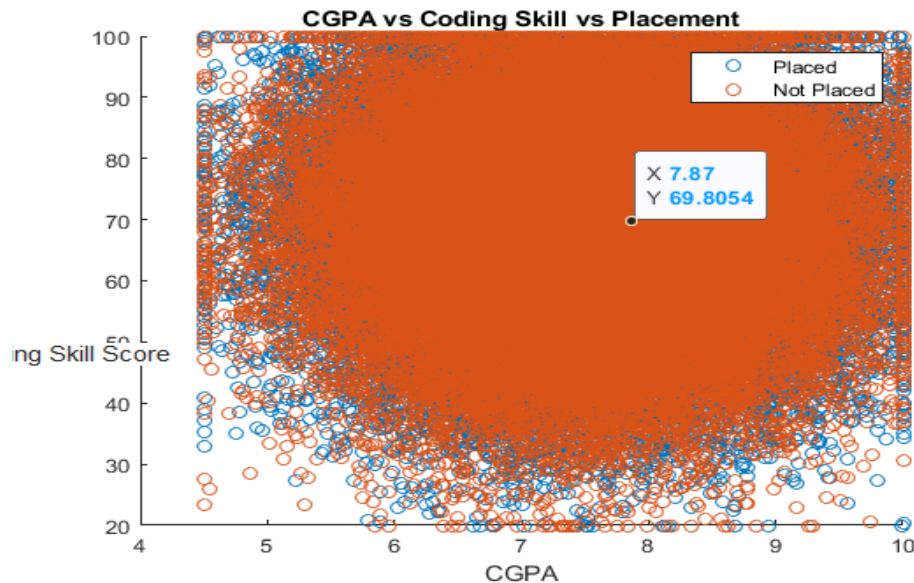
Placement	Number of Student
Placed	55000
Not Placed	46000



Variables

The following were used for the analysis: CGPA (Cumulative Grade Point Average) as a measure of academic performance, Coding Skill Score as a measure of technical competency, Number of Internships as a measure of practical exposure, Number of Projects as a measure of hands-on experience and Placement Status (Placed/Not Placed) as a dependent variable. The variables selected were those that are known to be relevant to the labor market in the present times.

Variable	Information
X-axis	CGPA
Y-axis	Coding Skill Score
CGPA Range	Approximately 4–10
Coding Skill Score Range	Approximately 20–100
Highlighted CGPA	7.87
Highlighted Coding Skill Score	69.8054



Data Analysis Tools

The analysis of the data used MATLAB functions which include: readable to read data; summary to summarize data; head to view the data; and visualization to plot the data.

Analytical Techniques

Descriptive Statistics. Basic statistical measures (frequencies and proportions) were used to gain understanding of the distribution of the variables. **Correlation Analysis.** The correlation of independent variable (CGPA, Coding skills, Internships, Projects) with dependent variable (Placement Status) was found to check the significance of the independent variables. **Data Visualization.** Various graphs such as bar charts (placement distribution) and scatter plots (CGPA vs. coding skills) were used to find trends and patterns. A valid and reliable instrument

must be used to measure a phenomenon. To measure a phenomenon, one must use a valid and reliable instrument.

Triangulation was done in terms of data sources (interviews, observation, and document) and theoretical frameworks (Kirkpatrick Model and Constructivism) to ensure the validity. The same data collection tools were used in all sites and systematic coding and analysis with multiple checks by reviewers was used to ensure reliability. The ethical aspects were informed consent of all participants, anonymity of the participants (pseudonymization) and confidentiality of the data (secure data storage).

Results and Integrated Discussion

Results of qualitative and quantitative parts of the study are presented and synthesized to come up with a holistic picture of the effectiveness of hybrid technical education and its impact on employment.

Qualitative Findings

Implementation Challenges

Qualitative analysis revealed a number of key issues that impact the effective implementation of the programs. **Inadequate Teacher Training.** Many tutors were not adequately prepared for hybrid pedagogy and the digital tools used, which negatively impacted the quality of instruction and tutors' capacity to effectively engage students. This professional development gap resulted in inconsistencies in the teaching practice and in an overall decrease in learning effectiveness. **Digital Literacy Deficits.** Students and staff had low proficiency levels in the use of Learning Management Systems (LMS) and other digital tools that are critical to blended learning. This competence gap limited access to learning resources and thus prevented the possible positive effects of technology enhanced learning. **Delayed Material Distribution.** Students often complained that the printed modules were not handed out on time leading to continuity of learning and gaps in learning. In fast-track programmes, delays had a significant negative impact on pacing.

Infrastructure Limitations. Lack of appropriate facilities for practical training was a problem in many institutions, as skill development was difficult. This deficiency directly affected the vocational aspect of the programme which is one of the strengths of the programme **Labour Market Misalignment.** In particular, the skills learnt were not necessarily aligned with employer needs. This disconnects limited students' employment opportunities and called into question the program's core value proposition.

Positive Outcomes

The program showed positive and significant results in spite of these difficulties. Pupils said they felt more confident and more interested in school. The program did well in re-engaging out-of-school youth and offered opportunities for further learning. Basic vocational skills were gained to improve independence and self-efficacy. It was noted that there was an improvement in motivation and active participation, which indicates that hybrid education can provide a supportive and engaging learning environment if conditions of implementation are favorable.

Quantitative Findings

Placement Distribution

The analysis indicated that 54 per cent of the students (32,400) were placed in employment and 46 per cent were not placed in employment (27,600). This distribution suggests that while a majority did enter into the labour market, a considerable part still had problems with getting into the labour market, which points to competitive employment conditions and a need to better match skills.

A list of factors that are likely to influence where a child is placed. Academic Performance (CGPA). There was a strong positive correlation between the CGPA and the placement success, which clearly shows that theoretical knowledge still has a significant role in the job selection process. Technical Skills (Coding). Students who performed well on the technical skills showed a much better rate of placement, which has increased in the labour market for digital and technical skills. Practical Experience (Internships). Internships were more likely to lead to employment as students who completed internships were more likely to have exposure to real world work settings and networks. Project Participation. Practical projects and academic work increased employability through problem solving skills and practical ability skills to show potential employers. Combined Effect. The quantitative results suggest that employability depends on a combination of academic performance, technical competencies, and real-world experience, suggesting the need for hybrid programs to develop all three areas to maximize employability.

Integrated Discussion

The Access-Employability Gap

Qualitative findings illustrate that blended education models like Middle Tech have a positive impact on access and in the re-engagement of out-of-school youth. Pupils shared evidence of positive engagement including increased motivation, confidence and participation. In quantitative results, however, it turns out that there is no guarantee of employability with access. Nearly half of pupils are not placed and there is a significant gap between school provision and employment. The finding has important implications: Enrollment and completion rates are not necessarily good indicators of program success when there is no labour market integration.

Validation of Constructivist Learning Theory

The findings are clearly presented and provide support for the Constructivist Learning Theory. In the case of students, practical learning activities (internships and projects) were found to have a significant positive correlation with placement outcomes. This is because learning is best achieved when it is active and real world. However, qualitative evidence suggests that opportunities for such experiential learning are still scarce in the program, as there are lack of resources and industry collaborations. This is one of the implementation gaps theories is good, practice is not as good.

Skill Alignment

Skill-labour market misalignment was identified as a key issue by both data sources. Qualitative results showed that stakeholders identified training content which is out of date or irrelevant for vocational training. The quantitative results showed that the technical skills, especially coding, had a significant effect on the placement chances. This convergence is an indication that market relevant skills need to be emphasized in programs to enhance employability outcomes. The coding skills variable in particular shows that it is not just the acquisition of skills that matters for placement success, it is the alignment of these skills with the demand of the labour market.

Practical Exposure's role

Both qualitative and quantitative results highlight the importance of practical experience. Students indicated greater confidence in the use of skills in authentic situations and data indicated a strong link between internships and projects and the probability of placement. This suggests that practical exposure is an important factor in employability, but the qualitative evidence suggests that opportunities for this are not always available in the current programme structures.

Systemic Implementation Barriers

Qualitative results show that there are systemic issues that indirectly hinder employability through a degraded quality of education: lack of teacher training on hybrid methods; inadequate digital infrastructure to maximize the use of platforms; lagged learning materials to ensure continuity of learning; and low industry engagement to maximize experiential learning. These challenges not only hinder and obstruct the participants but also directly impact the quality of learning and, therefore, employment outcomes.

Implications for Hybrid Education

The study indicates that hybrid education models have a great potential but need significant improvements to be fully effective. Programs need to: embed structured practical learning in core programs, align curricula in a dynamic way with the changing needs of industry, enhance teacher training in both pedagogical and technological aspects, and enhance the digital infrastructure to support consistent and equitable access.

Core Integrated Insight

The key message from the study is that hybrid education is a good way to enhance access, but employability is reliant on the relevance of the skills learnt, the practical exposure and industry alignment. Access is a condition, but not a sufficient one, for employment. If the education system isn't reformed to see students learning, students learning to apply and programs meeting the needs of employers, the hybrid technical education system may result in educated but un-employable students.

Recommendations

The integrated findings show that hybrid technical education initiatives, such as Middle Tech, have enjoyed some success in improving access, but their effect on employability is limited by

structural, pedagogical and market constraints. To achieve this, a multi-level future-oriented approach is thus needed to improve effectiveness, sustainability and scalability.

Policy-Level Recommendations

Establish a National Hybrid Technical Education Framework

At the present time, programs are disjointed with no national direction. The national framework for hybrid programs should: set curriculum standards for hybrid programs; set minimum requirements for digital infrastructure; connect vocational and academic learning pathways; and align with national education and employment policies. This would help to achieve consistency, quality assurance and scalability across provinces.

Enhance the investment in skills-based education.

The government should: enhance specific funding for vocational and technical training; set aside specific amount of money for digital learning infrastructure; and subsidize low-income learners to access hybrid learning. Skills-based education will directly help to reduce poverty and enhance economic growth.

Improve public-private partnerships (P3P)

Strong industry partnerships are necessary to help address the education/employment disconnect. The government should: partner with private companies to create industry relevant curricula; create structured apprenticeship and internship programs; and promote industry involvement in certification and assessment. This type of partnership will help keep training programs alive and dynamic in their relevance to the labour market.

Institutional-Level Recommendations

Hybrid Pedagogy Teacher Training (TPP)

To tackle the key issue of teacher preparedness, institutions must: offer compulsory training on hybrid teaching methods, enhance teachers' digital skills and proficiency in using LMS and teaching online, and implement continuous professional development (CPD) programs. Teachers must be trained and not only as teachers, but as facilitators of experiential learning as per the constructivist approach.

Improve Digital Infrastructure and Access

Technology is a major factor in learning outcomes and is very limited. Institutions should: have reliable and user friendly LMS platform; be able to access learning materials offline in low connectivity areas; and create digital learning centers in underserved rural areas. Collaboration with telecom companies can deliver special Internet packages for students at lower costs.

Develop Monitoring and Evaluation Systems

Program effectiveness should be reported via: ongoing program evaluation and feedback using the Kirkpatrick Model; student performance tracking dashboards; and feedback mechanisms for

continuous program improvement. Program quality and institutional accountability will be improved through data-driven decision making.

Curriculum-Level Recommendations

Curriculum alignment with needs of the labour market

To bridge the gap between training and employment: regularly analyze the labour market to understand the new demand for skills; update the curriculum based on industry feedback; and integrate new areas like digital marketing, freelancing platforms, e-commerce and AI basics. This will make sure that students learn skills that will be relevant in the future, and not skills that have been superseded.

Combine Project Based and Experiential Learning

Since there is quantitative evidence that projects significantly enhance employability: each course should have mandatory, assessed projects; students should be given problems to solve in real-world situations from authentic industry settings; and community-based projects should be added to develop technical and civic skills. This is not only a great way to build problem-solving skills, but it also shows employers that you have the ability to work.

Institutionalize Internship Programs

Internships should be a program staple and not an optional extra. Institutions should: systematically partner with local businesses and industries; offer guidelines and learning objectives for internships; and monitor and evaluate student performance during internships. This will help close the gap between school and the workplace.

Student-Level Recommendations

The Career Counseling and Guidance Services is a new unit that is scheduled to open in 2018. Students are not aware of viable career pathways. Institutions shall: create special units for career counseling; organize training sessions for students to be job-ready (CV writing, interview skills, professional communication); and direct students to market-oriented skill development. This will help students' confidence and strategic employability.

Certification and Skill Recognition

Students should be awarded certificates of competence, such as: industry recognized certifications, digital badges and micro-credentials, and portfolios of competence that demonstrate practical ability. These certifications add credibility and signaling power to a job market.

Recommendations for Technology and Innovation

AI and Adaptive Learning Systems Integration

AI-supported learning platforms that can adapt learning experiences to the student's progress; detect and proactively resolve learning gaps; and adaptively assess student learning in real-time

should be included in future hybrid education systems. This will enhance the effectiveness of the learning and learning outcomes of a variety of learners.

Use of Data Analytics for Decision Making

Data should be used to: monitor student progress and identify at-risk students; detect at-risk student behavior early on; and examine student placement patterns to make curriculum decisions. This is in line with the quantitative approach illustrated in this study and improves evidence-based planning.

Employability-Focused Recommendations

Industry Skill Labs developed.

Skill labs, simulating work conditions, should be created within institutions: IT & Coding labs with industry standard tools, technical workshops for vocational practice, Entrepreneurship Incubation centers for start-up development. These settings enable students to learn and showcase their abilities prior to entering the workforce.

Promote Entrepreneurship and Self-Employment

Programs should promote entrepreneurship by providing: training in small business management and financial literacy; support for start-up initiatives and business plan development; and linkage to micro-financing opportunities as there are limited formal job opportunities. This is especially crucial for the people living in the rural and marginalized areas where formal employment is not available.

Future Research Directions

Future research should build on these findings by: using machine learning models to more precisely predict employability outcomes; conducting longitudinal studies to follow long-term career outcomes; examining barriers to access and outcomes in hybrid models of education by gender; and comparing hybrid and traditional models of education with randomized designs. Such research will help to create evidence-based policy and program development.

Concluding Insight

This study's main message is that skill relevance, exposure and industry linkages are critical in addition to access to education to achieve meaningful employability outcomes. The potential of hybrid education to transform the paradigm of education in Pakistan is immense, but it can be harnessed only through a holistic, integrated and future-oriented approach, with employability as an integral component.

References

1. Akram, M. (2024). Educational inequality in Pakistan. [Publisher information needed]
2. Aslam, M., & Kingdon, G. (2011). What can teachers do to raise pupil achievement? *Economics of Education Review*, 30(4), 559–572.
3. Baloch, A., et al. (2023). Dropout trends in developing countries. [Publisher information needed]

4. Becker, G. (1993). Human capital: A theoretical and empirical analysis, with special reference to education (3rd ed.). University of Chicago Press.
5. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
6. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
7. Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential. *The Internet and Higher Education*, 7(2), 95–105.
8. Gohar, R., et al. (2023). Digital learning challenges in developing contexts. [Publisher information needed]
9. Government of Pakistan. (2023). *Economic survey of Pakistan*. Ministry of Finance.
10. Harvey, L. (2001). Defining and measuring employability. *Quality in Higher Education*, 7(2), 97–109.
11. Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), *Instructional-design theories and models* (pp. 215–239). Lawrence Erlbaum.
12. Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating training programs: The four levels* (3rd ed.). Berrett-Koehler.
13. Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.
14. Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record*, 115(3), 1–47.
15. Moore, M. G., & Kearsley, G. (2012). *Distance education: A systems view of online learning* (3rd ed.). Wadsworth.
16. Pakistan Institute of Education. (2024). *Education statistics Pakistan*. [Publisher information needed]
17. Piaget, J. (1972). *The psychology of the child*. Basic Books.
18. Save the Children. (2024). *Climate impact on education in South Asia*. [Publisher information needed]
19. UNESCO. (2024). *Global education monitoring report*. UNESCO Publishing.
20. UNICEF. (2023). *Out-of-school children in Pakistan: Country study*. UNICEF.
21. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
22. World Bank. (2022). *Pakistan education report*. World Bank Group.
23. World Bank. (2023). *World development report: Education and skills for jobs*. World Bank Group.
24. Yorke, M. (2006). *Employability in higher education: What it is—what it is not*. Learning and Employability Series, 1. ESECT/HEA.