

UNDERSTANDING THE VALUE OF MICROCREDENTIALS IN HIGHER EDUCATION IN PAKISTAN

Dr. Muhammad EHSAN

ORCID: 0000-0002-7253-7785
School Education Department
Government of Balochistan
Balochistan, PAKISTAN

Dr. Fouzia AJMAL

ORCID: 0000-0002-7346-2025
Faculty of Education
International Islamic University
Islamabad, PAKISTAN

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ABSTRACT

Today the world is witnessing a rapid change in industrial needs. Traditional education has failed to meet the current industrial demands. Micro-credentials have emerged as an innovative solution to address the evolving demands of higher education and workforce development to ultimately address the requirements of the changing industry. This research paper investigates the role of micro-credentials in strengthening educational quality and employability by offering targeted, competency-based certifications that complement traditional degree programs. Through a comprehensive analysis using mixed methods with a convergent design, the study reveals that micro-credentials facilitate flexible learning pathways, promote skills development, and provide institutions with a mechanism to align curricula with industry requirements. The findings indicate that students value the opportunity to receive specialized skills rapidly, while employers appreciate the direct correlation between micro-credential achievements and workforce readiness. However, the research finds out the challenges of standardization, quality assurance, and institutional integration that must be addressed to fully realize the potential of micro-credentials. Emerging as a catalyst for lifelong learning, micro-credentials not only empower learners to adapt to the rapidly changing technological settings but also offer universities a viable strategy to augment their relevance in a competitive academic environment. This paper concludes that effective implementation of micro-credentials can bridge the gap between academic training and real-world demands, as a whole contributing to a more resilient and vital economic environment. The insights of this study provide actionable recommendations for the inclusion of micro-credentials in higher education.

Keywords: Micro-credentials, higher education, online learning, digital skills, employability, skill-development.

INTRODUCTION

In today's rapidly evolving global economy, traditional education systems are being reshaped by innovative learning pathways designed to meet the demands of a dynamic job market. Among these, micro-credentials have emerged as a transformative approach, offering targeted, skill-based certifications that complement traditional degree programs. Institutes of Higher Learning have seen a significant rise in interest in incorporating micro-credentials into their curricula in recent years. Micro-credentials, like digital badges and certifications, provide a targeted and adaptable method of skill recognition and education (Saad, bin Abdul Jamal, & bin Amran, 2024). These compact and focused learning opportunities aim to bridge the gap between academic qualifications and the practical skills demanded by employers, making them an appealing option for both learners and industry stakeholders. In Pakistan, where higher education faces

persistent challenges of accessibility, employability, and alignment with market needs, micro-credentials are capturing attention as a potential game-changer. They hold the promise of preparing students with job-ready skills, promoting lifelong learning, and providing a framework that aligns academia with real-world demands. According to the World Economic Forum (2020), within the next ten years, half of all jobs will undergo substantial automation changes as a result of the COVID-19 pandemic. Regardless of their present qualifications, the current workers will need to immediately re-skill and/or up-skill if this prediction turns out to be correct (Tamoliune et al., 2023). However, as with any educational innovation, the integration of micro-credentials comes with its complexities, raising questions about their long-term impact, feasibility, and sustainability within the Pakistani context.

Meanwhile, advocates of micro-credentials argue their adaptability and targeted focus, which can address the specific needs of individuals and industries alike. These credentials enable learners to learn new skills quickly and affordably, often bypassing the time and financial investment needed for traditional degrees. The national qualification reference frameworks leaders, independent credentialing agencies, and universities have been forced to reconsider the broader credentials continuum by recent increases in the high expenses of higher education, employer worries regarding graduate abilities and skills, and student disappointments about the lack of job opportunities (McGreal & Olcott Jr, 2022). This is especially relevant in Pakistan, where youth unemployment and underemployment remain critical issues, and the freelance economy continues to expand. Micro-credentials could empower young professionals by offering them a competitive edge in the job market while empowering and promoting entrepreneurial ventures through specialized skill acquisition. Additionally, these credentials can be an inclusive solution for those unable to commit to full-time degree programs due to financial or personal constraints, providing flexible pathways to higher education and professional development. With the purpose of bridging the gap between traditional education and the demands of the modern job-force, they enable people to gain useful skills and information by providing self-paced, accessible, and reasonably priced learning alternatives. Without sacrificing their personal obligations or financial security, this strategy not only encourages lifelong learning but also helps individuals from a variety of backgrounds to fulfill their academic and professional goals.

Despite their potential benefits, micro-credentials also present significant challenges. Micro-credentials have the potential to be particularly useful in educational institutions and networks of institutions that are innovating both inside and outside of regular study options and programs. Due to ecosystem-level external factors that are outside of institutions' control and strategy, the widespread acceptance of micro-credentials in the future is considered uncertain (Pirkkalainen et al., 2023). Critics question their credibility and the lack of a standardized framework for recognition across institutions and industries. Without clear benchmarks, micro-credentials risk becoming fragmented and undervalued, undermining their purpose as a bridge between education and employment. For Pakistan, where higher education institutions already contend with issues of quality assurance, limited resources, and infrastructural gaps, the implementation of micro-credentials may introduce further complexities. Accessibility is another pressing concern; with a significant portion of the population residing in rural and underdeveloped areas, reliance on digital platforms for delivering micro-credentials could exacerbate educational inequities. Furthermore, there is a worry about the potential commodification of education, where the focus on skill certifications might undermine the holistic development and critical thinking cultivated by traditional degree programs.

Scope of the Study

This study rises on the horizon of digital transformation in higher education and focuses on the advantages of micro-credentials in degree programs in Pakistan. The diverse approach of the digital age makes this study a need of the time to fully understand the pros and cons of micro-credentials which have become a talk of the academia since the abrupt emergence of the importance of online education and digital credentials during the Covid-19 pandemic. During such emergency situations the world requires alternative settings of education which micro-credentials have the capacity to fulfil. Keeping in view the incredible spectrum of micro-credentials, this study is an effort to add some insights about the strong side and the challenging side of the micro-credentials in higher education.

Purpose of the Study

This study aims to shed light on the opportunities and challenges that micro-credentials pose while implementing them in higher education in Pakistan. Pakistan is a country with 241.49 million population (Gondal, 2023). Surprisingly, 64% of the total population is youth according the Pakistan Bureau of Statistics data and unemployment rate in Pakistan has risen to 6% in 2024 (Pakistan Economic Survey, 2023; pp:203). Since micro-credentials are considered a best solution to mitigate the unemployment rate by offering targeted skills-based online courses with digital recognition in various ways offered by the renowned organizations and higher education institutions worldwide. Thus, this study pours its little share to help understanding the value of micro-credentials in degree programs in Pakistan.

Problem Statement

Traditional degrees lag behind to meet the demands of the changing work environment. There is a gap between learning and practice. The graduates when expose to the industry face lack of the required skill. Micro-credentials seem a better solution to fill this gap seamlessly. Therefore, this study attempts to know the value of micro-credentials in higher education. Despite growing interest, there remains a lack of standardized frameworks and best practices to embed these competency-based certifications into academic pathways. This study addresses this looming topic by rigorously examining what value micro-credentials add when they are effectively integrated into higher education, ensuring quality assurance and alignment with industry demands. The research aims to provide a strategic blueprint of the advantages of micro-credentials in higher education, ultimately promoting the relevance and responsiveness of academic programs in a dynamic economic realm.

Study Objective and Research Question

The objective of this study was to examine the value of integrating micro-credentials into higher education in Pakistan, posing the question that what is the value or advantage of integrating micro-credentials into higher education in Pakistan?

LITERATURE REVIEW

Benefits of Micro-Credentials in Higher Education

Since their inception, micro-credentials have undergone changes. They started out as simple electronic badges that were used to distinguish between novice and expert members in discussion boards as well as social media platforms. But now they serve as a means of showcasing talents and abilities rather than just highlighting user distinctions, making them micro-credentials. With the development of micro-credentialing, students can now participate in performance-based evaluations, which are quicker and less costly than standard degrees for skill development (Rottmann & Duggan, 2020). Micro-credentials, which are brief, targeted credits intended to impart the necessary information, abilities, and experience, have become increasingly important in recent years. Additionally, aggregated micro-credentials might serve as a route to a degree or certificate. One of the practices and technologies that will have a big influence on how higher education is taught and learned in the future is micro-credentials (Cevik, Derman, & Ulucan, 2024).

Our learning and working methods have drastically changed in the digital age. All citizens must improve their digital skills as the world moves toward the digital economy and society. As a result, the urgent requirement for citizens and the workforce to undergo huge upskilling and reskilling is greatly improved by micro-credentials and other digital acknowledgment of learning (Λυγούρα, 2024).

Tamoliune et al. (2023) find in their study that micro-credentials have the potential to be realized in a number of ways, including increasing opportunities for people to retrain, upskill, and enter the workforce (economic context), improving lifelong learning by creating flexible personal educational pathways (social context), expanding services for evaluating and recognizing informal and non-formal learning, and integrating stackable credits and prior credentials (higher education context). Micro-credentials with supporting evidence can

help students learn on their own, clarify their qualifications, and promote inclusivity in the assessment and credentialing procedures (Reed, 2023). Institutions have an incredible opportunity to identify and validate smaller-scale instructional activities that support student achievement but sometimes get overlooked owing to micro-credentials. They can offer a more sophisticated view of a person's abilities and knowledge, which may help in identifying further learning objectives and more effectively matching workers with employment (Abramovich & Reed, 2024).

Value-Addition

A micro-credential is evidence of a student's experience, knowledge, and skills that can be used to advance quickly toward a more comprehensive certificate or degree with an emphasis on a certain subject of study. Micro-credentials are a relatively new field in education that has grown a lot in the last few years and gained popularity in the field of higher education. Students now have unusual access to learning possibilities thanks to the extensive usage of technology within educational institutions. Higher education institutes (HEIs) allow students from across the world to enroll in their fully or partially online formal and non-formal courses. The COVID-19 pandemic brought attention to the need for funding possibilities for lifelong learning and had a significant impact on the educational sector both domestically and internationally. Compared to before the pandemic started, higher-education learners are more equipped for online learning because of the extensive use of online educational platforms during the outbreak. Students do not need to be present or finish their coursework on campuses in order to earn a degree because the majority of educational tasks can be completed online (Alsobhi et al., 2023).

Institutions and learners do not need to experience the same advantages for the effective adoption of micro-credentials; a "one-size-fits-all" strategy is neither required nor ideal. A significant international and national plan must be developed and implemented to get over a number of technological and policy-related challenges that higher education institutions cannot control or address on their own if the broader impact of micro-credentials is to be felt (Pirkkalainen et al., 2023). The growing diversity of the student population has raised the demand for more individualized and flexible learning pathways. One of the factors thought to facilitate these individualized learning opportunities is micro-credentials (Kukkonen, 2021). In the twenty-first century, micro-credentials are becoming more and more popular as effective means of quickly upskilling the workforce and as possible career paths for some students. Micro-credentials have gained popularity in the 21st century as a quick and efficient way to upskill professionals and as potential career routes for some students (Varadarajan, Koh, & Daniel, 2023).

Similarly, Omona & Mbabazi (2024) find a number of socioeconomic factors and technical advancements have caused higher education to constantly evolve. The needs for an educated workforce, rising tuition, rising enrollment, and shifting student demographics seem to be at the center of this ongoing transformation. A fragmented strategy, like microlearning, gives institutions the chance to deliver a useful answer for a clientele that is evolving. In conclusion, educators in higher education must comprehend the value of integrating new technology into the classroom and how they directly relate to talent and proficiency. Yet, micro-credentials are becoming more and more popular around the world as effective means of quickly upskilling the workforce for the twenty-first century and as possible career paths for many students. Micro-credentials provide focused, adaptable learning opportunities and have been approved by European Union as a means of improving employability and lifelong learning (Martin Gilete & Blanco Garcia, 2024).

Although Industry 4.0, the paradigm shift that reflects the technological reality of today, has only opened up the "infinite Universe" of possibilities and satisfied business and practical needs, there are still challenges in this area, both in terms of expanding and improving the system of micro-credentials as a whole. Unquestionably, these developments have increased the demand for ongoing upskilling and upgrading by opening up new industry sectors, professional disciplines, and some careers in more specialized subspecialties. Micro-credentials, a contemporary idea for creating a practical and educational blend of knowledge and abilities, boost competitiveness in every sector and company setting. In order to avoid investing in a costly, protracted educational and teaching process, the term of micro-credentials additionally involves establishing a sufficient number of courses and hands-on skills inside the higher education and business community as a whole or institutions that are authorized that offer such practical trainings. In addition to acquiring

skills in information and communication technology, online business, digital marketing, data analytics, accounting or finance, corporate planning, and other related fields, micro-credentials are frequently found in intermodal domains. The career growth and mobility of workers, including those engaged in non-traditional forms of employment like those in the digital economy (all economic activity resulting from actual or planned business deals in the market place and assisted either directly or indirectly through online platforms, in particular online-intermediation support and online search engines), can also be actively supported by micro-credentials. Depending on their employment status, these individuals may also face barriers to training (Temjanovski, Chabukovski, & Zlatkovski, 2023).

Micro-Credentials in Skill Development and Employability

Our learning and working methods have drastically changed in the digital age. All citizens must improve their digital skills as the world moves toward the digital economy and society. As a result, the urgent requirement for citizens and the workforce to undergo huge upskilling and reskilling is greatly aided by micro-credentials and other digital acknowledgment of learning (Λυγούρα, 2024).

Tamoliune et al. (2023) find in their study that micro-credentials have the potential to be realized in a number of ways, including increasing opportunities for people to retrain, upskill, and enter the workforce (economic context), improving lifelong learning by creating flexible personal educational pathways (social context), expanding services for evaluating and recognizing informal and non-formal learning, and integrating stackable credits and prior credentials (higher education context). Micro-credentials with supporting evidence can help students learn on their own, clarify their qualifications, and promote inclusivity in the assessment and credentialing procedures (Reed, 2023). Institutions have an incredible opportunity to identify and validate smaller-scale instructional activities that support student achievement but sometimes get overlooked owing to micro-credentials. They can offer a more sophisticated view of a person's abilities and knowledge, which may help in identifying further learning objectives and more effectively matching workers with employment (Abramovich & Reed, 2024).

Interestingly, micro-credentials are an alternate method of professional and career growth that allows a person's abilities, successes, and accomplishments to be acknowledged. They provide the opportunity to improve abilities, manage career paths, and infuse academic content with real-world applications. Furthermore, micro-credentials are an economical professional development approach that lowers employee training expenses and time. In higher education institutions (HEIs), micro-credentials also refer to the incorporation of digital badges into curricula and community engagement initiatives to encourage lifelong learning and professional growth for students, teachers, and communities in formal learning environments (Ghasia, Machumu, & Smet, 2019). Academic credentials are losing their predictive value for employment success. For a long time, having an academic background or a strong academic credential was considered a crucial, if not essential, need for employment applications. This has just begun to erode. An increasing number of alternative qualifications begin to get attention and become valuable. Employers are becoming more interested in alternative routes to higher education than those found in the conventional system. These various routes frequently result in certificates obtained through professional training or post-secondary study following initial graduation. Micro-credentials are a relatively new concept that has received acceptance across a number of academic fields. Instead of representing the wider and linked sets of skills, such as complete bachelor degrees or similar, that are reflected in current credentialing systems, they signify mastery of a specific set of skills or competencies. Micro-credentials are directly connected to digital evidence that define the essence and standards of the credential as well as proof contributed by the earner, in contrast to these modern and traditional credentialing rules and regulations, which are typically stated through a certification or transcript with no link to explicit proof of the earner's skill sets (Ehler, 2018).

Higher education providers are under pressure to deliver learning opportunities that are both flexible and focused. Target audiences can be effectively reached by creating micro-credentials, or disaggregating credentials. Students can meet their urgent learning demands thanks to the availability of micro-credentials. Micro-credentials can offer components of vocational training to the industry. However, creating micro-credentials that offer the higher education-related cognitive perspective that ensures an appreciation of a related body of information or subject of study is difficult. Additionally, the education that higher education

institutions offer must be able to support the institution's continuing academic life, which depends on the classroom instruction being informed by research and cutting-edge knowledge in the field and the research area being restocked with talent that appreciates their field of study and related bodies of knowledge. This makes it possible to think of it as a sort of ecosystem that depends on students learning more than just bits of information or knowledge to survive. There are repercussions when creating guidelines and protocols for the creation, acceptance, and distribution of micro-credentials in higher education. Micro-credentials must be directly linked to the existing and developing knowledge in a field of study or academic discipline in procedures and policies. When it comes to awarding credentials, academic standards must be upheld. Support and development for related staff is necessary (Ling & Ling, 2023). The European Union has approved micro-credentials as a means of improving employability and lifelong learning, as they provide focused, adaptable learning opportunities (Gilete & Garcia, 2024).

Meanwhile, Micro-credential proponents see them as tools for training or upskilling people (Sharma, Jain, Mogaji, & Babbilid, 2024). While, Keoy et al. (2024) argue, micro-credentials are closely related to employability, lifelong learning, and new digital education models as a result of the growth of online learning. These days, micro-credentials are seen as being important to the transformation of higher education.

Discussions regarding the importance of higher education indicate that there is a gap between students' job prospects and their skill set. It is challenging for students to see the importance of the work they accomplish both inside and outside of the classroom. For instance, in the classroom, people believe that their effort is valuable (i.e., worth a grade) just there. They don't think that the skills they learn in university, both academic and extracurricular, will be useful in the profession. The employer argues that the graduates they employ lack the skills that are required to fulfill the demands of the job (Stoerger et al., 2021). Employers in today's rapidly evolving labor market are giving preference to candidates who have not only technical capabilities but also creative thinking, interpersonal skills, and problem-solving skills. Employers find candidates more appealing when they demonstrate these particular competencies in an organized manner using micro-credentials. Micro-credentials are a major advancement in higher education that has surfaced in recent years. These little but significant academic achievement badges have the power to change the way we study and acquire new abilities and skills. Although their ability to diversify education and improve skill acquisition has generated a lot of excitement, there is also doubt about their overall worth and rigor (Alenezi, Akour, & Alfawzan, 2024).

The European Skills Agenda 2020 includes micro-credentials. The aim of this five-year strategy is to address system needs from communities, industry, and employers by fostering the development of better applied and broader labor skills. In the job market, workers are more and more interested in acquiring new skills-based credentials fairly in a short time (Zdunek et al., 2024). Micro-credentials, which symbolize the achievement of specific skills and competencies, have attracted significant attention because of their versatility, conformity to industry standards, and compatibility with efforts to pursue lifelong learning. Although they come in a variety of forms, Massive Open Online Courses (MOOCs) are frequently associated with micro-credentials. Despite the increasing prevalence of MOOCs and the growing number of students earning micro-credentials, formal educational environments still face challenges in recognizing these credentials (Atas, 2024). Because micro-credentials can adapt to the swift shifts in a variety of industries, they have grown in popularity in the contemporary jobs market. Flexibility, focused, and customized learning opportunities that close certain skill gaps and get students ready for the workforce are provided by these credentials (Cheng et al., 2024).

RESEARCH METHOD

This study comprises of the mixed methods using quantitative and qualitative analysis with a convergent research design. Mixed methods research improves understanding of various data types by combining qualitative and quantitative analysis. It adds qualitative insights to quantitative findings, enabling a more customized and culturally sensitive investigation of research problems (Lee, 2024). While, convergent research designs collect quantitative and qualitative data at the same time, analyze them independently, and then combine the results to offer a thorough grasp of the subject (Smiddy et al., 2024).

Mixed Methods Research Design

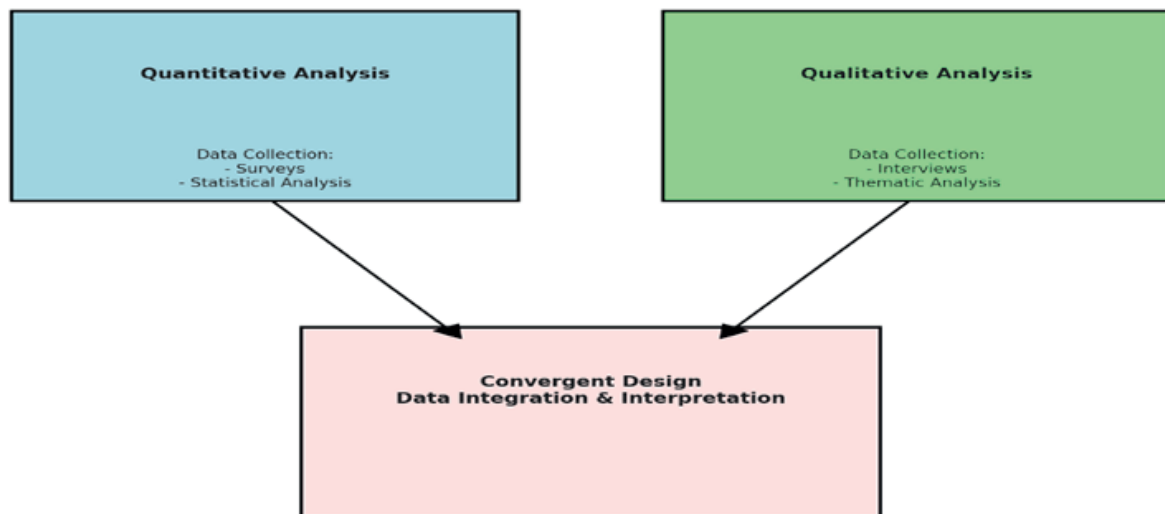


Figure 1. Mixed methods with a convergent design

Through meticulously integrating or combining strong quantitative and qualitative research approaches, mixed methods draws on each approach's advantages. By combining inductive and deductive reasoning, mixed method approaches enable researchers to employ a variety of techniques. They also counterbalance the disadvantages of only quantitative and qualitative research by using complementary strategies that optimize the strengths of each data type and promote a greater understanding of issues and possible solutions (Brent et al., 2023). Mixed methods can be used to develop a strong presentation and analysis of the data, improve the understanding of quantitative results, or determine the wider applicability of qualitative findings from small samples (Community Engagement program, 2025). A combination of methods Research involves using at least one qualitative and one quantitative approach in a single study or group of related studies. Combining quantitative and qualitative research techniques (Bailey et al., 2022).

Characteristics of Participants and Sampling

The participants of this study consist of higher education students who have completed at least a single online course from any digital learning platform and the HEC led Digital Learning and Skills Enrichment Initiative (DLSEI) focal persons in the public and private universities of Pakistan. While, keeping in view the expanded population, a multi-stage sampling technique has been used for this study setting a step-wise approach for sampling. In the first stage, 20 universities (two public and two private) from each geographical zones of Pakistan have been selected. In the second stage, 20 DLSEI focal persons have been chosen for the interviews to have their broader perspectives. In the third stage, 400 Coursera license holders (20 students from each of the 20 universities) have been selected for a survey to get their responses. Whereas in the fourth stage, four popular learning tracks (Data Analytics, Management Sciences, Business and Marketing, and Programming Languages) have been selected which are found from the two disciplines (Computer Sciences and Management Sciences).

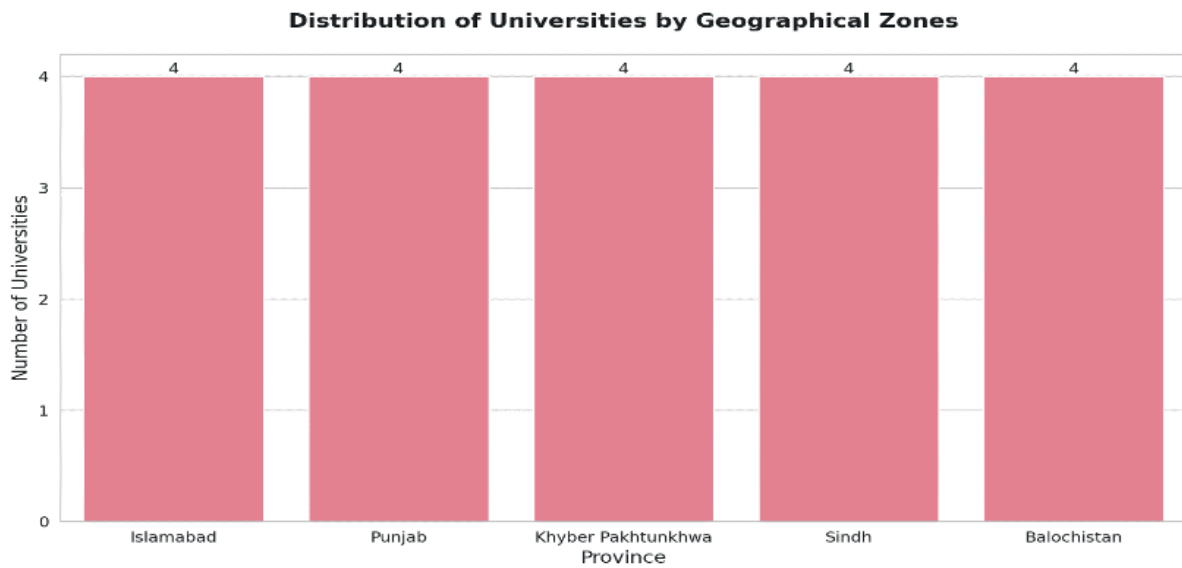


Figure 2. Number of sampled universities from each geographical zone of Pakistan

The data presented in Figure 2 illustrates the distribution of sampled universities across the various geographical zones of Pakistan. The sample comprises an equal representation of public and private universities, ensuring a balanced perspective. The selection of these institutions was carried out using a convenience sampling method, which, while pragmatic, allows for the inclusion of accessible and relevant universities within the study's scope. This approach provides a foundational basis for analyzing the educational landscape across different regions of the country.

Data Tool

A self-developed pre-structured questionnaire has been used for a survey among the students who have completed at least one online course from any online learning platform to get quantitative data. While a semi-structured questionnaire framework has been used to interview the focal persons of HEC's Digital Learning and Skills Enrichment Initiative (DLSEI) focal persons to get qualitative data. The sampled universities have been visited physically by the researcher and the data has been collected from the students and the focal persons have been interviewed face to face which were recorded in a recording app in the researcher's personal smart phone.

Data Tool Validity and Reliability

The data tool has been validated by academic experts from different universities in Pakistan including University of Wah (Education Department), Punjab University, Lahore (Education Department), Superior University, Lahore (Faculty of Arts and Social Sciences) and from the internal experts of the Faculty of Education, International Islamic University, Islamabad. While, the reliability of the data tool has been checked using Cronbach's Alpha test in SPSS software version 27, which is overall (.872).

Table 1. Reliability Statistics

Cronbach's Alpha	N of Items
.872	2

Study Limitations

1. Due to time and expenses constraints, this study is limited to only 20 universities across Pakistan.
2. Because of a huge list of offered courses online on Coursera through HEC Pakistan, this study is limited to only four learning tracks from the two disciplines (computer sciences and management sciences).
3. Due to limited access to the students who have completed at least a single course online, only 20 such students have been included in this study from each university.

DATA ANALYSIS

In the past 20 years, mixed methods research has emerged as the third methodological movement that supplements the qualitative and quantitative movements already in place. The combination of more than one method in a research study that produces data that is both quantitative and qualitative is now referred to as “mixed methods” (Hall, 2013). This study uses both quantitative and qualitative data methods. The quantitative data has been analyzed through Statistical Package for Social Sciences (SPSS) version 27, applying cross-tabs test. While, the qualitative data has been thematically analyzed using MAXQDA software.

Quantitative Data Analysis

Analyzing quantitative data involves looking at numerical data in order to compile and interpret results. Usually, statistics are used to explain data variability and averages (Midgley & Christmas, 2024). In this study, a pre-structured questionnaire has been developed to distribute among those students (n=400), (n=20) students from each of the sampled (n=20) universities across Pakistan who have completed at least one short course using any online platform. The collected data then was put into the SPSS software and considering the nature of the data, cross-tabs test was applied on the data. The results can be seen below.

Table 2. Integrating micro-credentials into higher education can increase the value of the degree.

S. No.	Name of University	SA	A	N	DA	SDA
1	Quid e Azam university Islamabad	5	6	3	5	1
2	COMSATS University Islamabad	7	8	1	3	1
3	FAST University Islamabad	5	6	4	3	2
4	Foundation University Islamabad	3	9	0	7	1
5	Punjab University Lahore	4	8	4	3	1
6	University of Agriculture Faisalabad	6	14	0	0	0
7	LUMS University Lahore	5	15	0	0	0
8	UMT Lahore	7	13	0	0	0
9	University of Peshawar	5	14	1	0	0
10	Gomal University D. I. Khan	7	13	0	0	0
11	Qurtuba University D. I. Khan	4	16	0	0	0
12	Pak-Austria Fachhochschule Haripur	5	15	0	0	0
13	University of Karachi	6	13	1	0	0
14	NED University Karachi	5	5	3	5	1
15	Sir Syed University of Engineering and Technology Karachi	3	9	0	7	1
16	Sindh Institute of Management and Technology Karachi	7	13	0	0	0
17	University of Balochistan Quetta	5	6	3	5	1
18	BUIITEMS Quetta	5	15	0	0	0
19	SBK Women University Quetta	7	12	1	0	0
20	Al-Hamd Islamic University Quetta	7	6	3	2	2
	Total	108	217	24	40	11

Table 2 shows the responses from 20 Pakistani universities on the possible effects of including micro-credentials in degree programs. The data is set according to how much the statement “Integrating micro-credentials into degree programs can increase the value of the degree” is agreed with. Five categories have been used to categorize the responses: Strongly Disagree (SDA), Agree (A), Agree (SA), Disagree (DA), and Neutral (N).

According to the data, most university respondents agreed (A) or strongly agreed (SA) with the statement. Of the responses (n=400) (20 universities × 20 responses per university), 217 (54.25%) agreed (A), while 108 (27%) strongly agreed (SA). This suggests a very favorable opinion (81.25% total) that micro-credentials can add value to degree programs.

While, only 24 respondents, or 6% of the sample, are Neutral (N), 40 respondents, or 10% of the sample, disagree (DA), and 11 respondents, or 2.75 percent, strongly disagree (SDA). This suggests that although most people believe micro-credentials are beneficial, a small percentage do not or are not convinced.

With no responders opposing or strongly disagreeing, universities like Gomal University D. I. Khan, LUMS University Lahore, UMT Lahore, and the University of Agriculture Faisalabad show exceptionally high levels of agreement. This suggests that there is broad agreement within these higher education institutions regarding the possible advantages of micro-credentials. Meanwhile, responses from some universities, like Sir Syed University of Engineering and Technology Karachi, Quaid-e-Azam University Islamabad, and Foundation University Islamabad, are more varying, with a sizable portion of respondents opposing or staying neutral. This can be the result of different institutional cultures or exposure levels to micro-credentials.

Table 3. Mean and standard deviation of the data shown in table 1

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Integrating micro-credentials into degree programs can increase the value of the degree.	400	1.00	5.00	2.0725	.98726
Valid N (listwise)	400				

The descriptive statistics in table 3 show that most respondents believe integrating micro-credentials into degree programs can increase the value of a degree. The mean score of 2.0725, which is close to 2 (Agree), indicates a general agreement among participants. The standard deviation of 0.98726 suggests that responses were fairly consistent, with minor variations. As a whole, the data reflects a positive perception of micro-credentials as a valuable addition to degree programs.

The received data indicates that integrating micro-credentials into university degrees is generally seen as a valuable approach in Pakistan’s higher education system. This is in line with global trends that show micro-credentials are becoming more and more recognized as a means of improving employability, offering flexible learning paths, and maintaining curriculum relevance to industry demands.

Table 4. Skill-based short courses can evolve market employability of the graduates.

S. No.	Name of University	SA	A	N	DA	SDA
1	Quid e Azam university Islamabad	7	11	0	1	1
2	COMSATS University Islamabad	10	7	0	2	1
3	FAST University Islamabad	11	6	0	1	2
4	Foundation University Islamabad	8	7	0	4	1
5	Punjab University Lahore	7	11	0	1	1
6	University of Agriculture Faisalabad	7	12	1	0	0
7	LUMS University Lahore	6	14	0	0	0
8	UMT Lahore	8	10	1	1	0
9	University of Peshawar	8	12	0	0	0

10	Gomal University D. I. Khan	4	16	0	0	0
11	Qurtuba University D. I. Khan	5	15	0	0	0
12	Pak-Austria Fachhochschule Haripur	5	12	2	1	0
13	University of Karachi	7	12	0	1	0
14	NED University Karachi	7	11	0	1	1
15	Sir Syed University of Engineering and Technology Karachi	8	7	0	4	1
16	Sindh Institute of Management and Technology Karachi	5	15	0	0	0
17	University of Balochistan Quetta	7	10	0	2	1
18	BUIITEMS Quetta	4	15	0	1	0
19	SBK Women University Quetta	7	13	0	0	0
20	Al-Hamd Islamic University Quetta	11	7	0	1	1
	Total	142	223	4	21	10

The data shown in Table 4 reflects the responses of the students from the 20 universities in Pakistan about how skill-based short courses could improve graduates' employability in the job market. A large number of respondents (91.25%) agreed or strongly agreed with the statement, showing an overwhelming agreement that such types of courses can highly increase graduates' skills for job market. In particular, the strong belief in the importance of skill-based training as a connection between academic education and job market demands is seen by the fact that 223 respondents (55.75%) agreed (A) and 142 respondents (35.5%) strongly agreed (SA).

On the other hand, indicating widespread institutional support for skill-based learning as a tool for improving employability students from the institutions such as LUMS University Lahore, the University of Peshawar, and Gomal University D. I. Khan showed particularly high levels of agreement with no respondents disagreeing or strongly disagreeing. However, a small minority of respondents (5.25%) showed disagreement or strong disagreement, with only 1% remaining neutral, indicating some doubts, particularly students from the universities such as Foundation University Islamabad and Sir Syed University of Engineering and Technology in Karachi.

Table 5. Mean and standard deviation of the data shown in table 4

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
Skill-based short courses can evolve market employability of the graduates.	400	1.00	5.00	1.8350	.88018
Valid N (listwise)	400				

The responses indicate strong agreement that skill-based short courses can increase graduates' employability. With a mean of 1.83, most participants incline towards agreement, and the low standard deviation of 0.88018 suggests consistency in their views. This shows a general belief in the positive impact of such courses on career prospects.

Nonetheless, these opposing responses may come from concerns about the quality, recognition, or compatibility of short courses with industry demands. Overall, the findings show a strong institutional belief in the transformative power of skill-based short courses to narrow the employability gap though targeted efforts may be required to address skepticism and ensure effective integration of such programs into the larger educational environment.

Qualitative Data Analysis

The analysis of non-numerical data in order to understand concepts, views, or experiences is referred to as qualitative data analysis (Pham, 2024). Whereas, thematic analysis is a type of qualitative research technique that recognizes, analyzes, and reports themes (or patterns) within data (Braun et al., 2024). In this study,

the primary theme was advantages and disadvantages of integrating micro-credentials in higher education in Pakistan aligning to the research objectives and research questions. Therefrom, 2 sub-themes i.e. value-addition and contribution to skill development and employability have been identified and highlighted from the received responses. Afterwards, these themes were meticulously analyzed.



Figure 3. Visual presentation of sub-themes

The above figure 3 shows how the two sub-themes i.e. value-addition and skill development and employability are achieved as a result of the inclusion of micro-credentials in higher education.

Experts Interviews

The study involved a purposive sample of 20 universities across Pakistan, with representation from each of the country’s geographical zones. Specifically, four universities were selected from each zone, comprising two public-sector institutions and two private-sector institutions. Experts representing these universities in the domain of digital education, as recognized by the Higher Education Commission (HEC) of Pakistan, were invited to participate in the research. Semi-structured interviews were conducted with these experts, and the sessions were recorded in both audio and video formats to ensure comprehensive data capture. The recorded interviews were subsequently transcribed verbatim and subjected to thematic analysis using MAXQDA software, a robust qualitative data analysis tool, to identify and extract key themes and patterns.

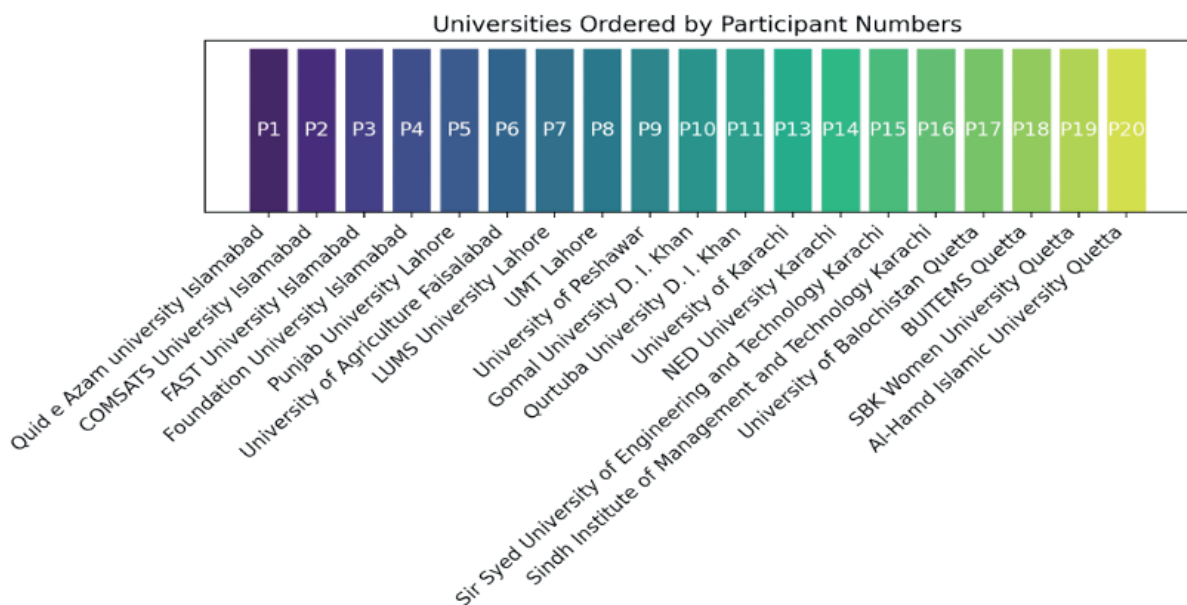


Figure 4. Participants Coding

In accordance with the aforementioned criteria, the interview responses have been meticulously analyzed and are presented below. It is important to note that the tables display the interviewees' direct quotations, each of which is accompanied by a detailed analysis.

Thematic Analysis and Findings

As mentioned earlier two themes have been found from the received data which included value-addition and skill development and employability.

Table 6. Value-Addition

Participants	Responses
P1	It is hard to compare micro-credentials with traditional degrees. Micro-credentials are offered in a very limited scope. If we talk about an online degree and traditional degree, so definitely we are not prepared for an online degree so far. There are several reasons. The quality education that is imparted in person is not imparted in online mode. Quality is the number one issue. While, in accessibility perspective, online is better. They are used to enhance your skills or learn new skills.
P2	This is the era of online. Even international dissertations are done online these days. Today's life is too much busy. Even students cannot cope up with their work burden. Online gives flexibility to students. Secondly, Coursera offered courses are from international universities, so their content is a bit different from the traditional courses. Thirdly, because certifications are also involved in it, so skills are developed in it. As they also contain assessments, so the learnt skills are tested as well. Thus, if we have a mix of traditional learning with the online learning. It would be the solution for the students.
P3	It helps students in learning interdisciplinary courses. Suppose a BS Computer Science student studies a management course as a part of the course but she/he does not have clear concepts in it, so she/he can easily seek help from Coursera. She/he can easily understand the alignment of the courses through Coursera offered courses. Technically, you can learn earning ways from these courses. It has a very positive role in higher education. It will be very cooperative.
P4	Micro-credentials offer targeted skills and knowledge, complementing traditional degrees. They help you quickly gain specific expertise, making you more competitive in your career. For example, you can earn a micro-credential in digital marketing to boost your job prospects.
P5	The value of these micro-credentials is perfect as a whole. But if we see them in comparison with the degree programs, the degree programs is a diverse universe. In a degree program different subjects are taught for a single degree program. But in certificate programs a single particular area is covered. Degree cover a comprehensive area of a particular subject. Degree develops a culture in students to adopt to those knowledge and skills required for the particular subject field and particularly develops R &D. While micro-credentials focus on a single area. Skills are important but degree has its value preserved. The worth of a degree can't be denied.
P6	Micro-credentials is good strategy because It's to-the-point and totally skills based. Any person from any subject can enroll different skilled courses.
P7	Online courses have a huge market. You are teaching state of art skills through online medium. I do not see any harm in online learning. It is full of benefits. Debate arises when you say of closing all the physical learning and shifting learners towards online mode of learning. However, online courses should be relevant, meaningful, contextual, and beneficial for the learners. It depends on the purpose of doing it. If you are doing it for skill development, professional growth, or job. Both the regulatory bodies and the universities will have to think about that. Online learning can also play its role in those courses which evolve with the course of time. Pakistan cannot become an advanced economy of the 21st century without going for the integration of micro-credentials in higher education.
P8	Traditional degrees have their own advantages and online learning have their own advantages. The coming age requires skill-set along with the traditional degrees. Online platforms play a key role in this regard. In the coming times, I don't think that we will rely only on the on-ground university degree, but it will be more easier to access an American university degree online.
P9	Traditional degrees provide a proper learning environment, so online courses do not have much value before traditional learning. Virtual learning cannot be an alternate of face-to-face learning.
P10	In traditional degree programs, the teacher stands on the spot and conducts practical themselves, whereas in micro-credentials, there is no teacher on the spot. But the thing is, some students are very hardworking on their own and they gain a lot.
P11	Micro-credentials offer flexibility and are targeted, allowing learners to acquire specific skills quickly. They complement traditional degrees by providing practical skills that are immediately applicable in the job market. Personally, I have seen students enhance their employability through specialized courses in data science and digital marketing.

P12	<p>It is essential to foster a culture of lifelong learning. Micro-credentials play a significant role in this by offering accessible and flexible learning opportunities that cater to the evolving needs of the workforce. This is very good step for the students, as there was a huge gap in learning. As you might have heard of Outcome-based Education (OBE). It says you have to give students more than one chance of learning. If a student misses out a mid-term paper and misses an assignment, it will not be fair to not give them another chance. Any issue may happen to them. He deserves to be given another chance. Normally in Pakistani universities students are not given a second chance to prove their competence. The purpose of education is to learn which is a continuous process. If a student cannot learn in first attempt, they may learn it in a second or a third or fourth attempt. So their this right should not be held away.</p>
P13	<p>Micro-credentials offer targeted, flexible learning, quickly addressing specific skills gaps, making them valuable for continuous professional development. While traditional degrees provide a comprehensive education, micro-credentials excel in agility and relevance, enabling individuals to adapt swiftly to evolving industry demands. Personalized experiences enhance employability and career advancement. Employers value these credentials as evidence of practical expertise, making individuals more competitive in the workforce.</p>
P14	<p>In today's world, universities use both online as well as traditional methods of education to create a lasting impact. However, human-to-human experience of on-premises can never match with an online activity. However, online platforms give you the freedom. They are boundless. You can launch your own courses by engaging someone else from another university. In modern world, this is a very prevalent method. It is better that we adopt them in our higher education and even below that.</p>
P15	<p>Now-a-days, if you see, there is a competitive market. When you go for your digital ID especially like LinkedIn when you develop your profile there, you will be experiencing exposure to the whole world. Your profile is available to all the HR consultants and all the companies across the digital world, because we are living in the global village. When we say that we do not place our CV, when just build our skills which we learned through the particular platform and those credentials are verifiable from the online Credly or different platforms. So that is making a trust level in the international HR companies and they offer you according to your skill-set. Lastly, I have observed various case studies like in 1980's there is a trend that all of the youth is going for Masters in Business Administration (MBA) and Bachelors in Business Administration (BBA) degree programs and courses. But now what happens that they went in the market and not getting a job. But those Business administration students or graduates who have done their graduation in past but they have upgraded their skills with Power BI, with SPSS, and different kinds of skill-set. They are skill required. Demand is there for them. Similarly, different organizations are also seeking cut resource which is available with the especially AI based dashboard designing, with the decision management system for artificial intelligence services, they are hiring those people. If you are static, you cannot survive in the market. When we say that AI or Machine Learning will make human jobless, that is not the case. But they are there to help you out to make your efficiency more effective and you can perform easily in a less time. With the help of these trending technologies, with the real time systems we can develop a lot of innovative ideas. In Pakistan, there is a huge gap between the automation processes and the industrialization. Especially when we see, a data is growing at the very rapid pace. So more than 30% of the jobs in the near 2030 is related to the data analytics, data engineering, machine learning engineering, AI engineering. That is very much required in the market and that is only possible with the help of updated knowledge and skills with the micro-credentials.</p>
P16	<p>Micro-credentials are a valuable asset in learning. Traditional degrees mostly focus on theory, but micro-credentials focus on skills. In contrast, degree programs offer a vast variety of courses, while micro-credentials offer a limited learning in a short span of time. Moreover, degrees are more relevant for job offers in our system.</p>
P17	<p>Micro-credentials provide target specific skills needed for job or it may enhance the employability as it demonstrates a commitment to continuous learning and skill development.</p>
P18	<p>In comparison to traditional degrees, micro-credentials offer a more focused and dynamic approach to learning. Personal and professional experiences have shown that students tend to be more engaged and motivated, leading to enhanced self-study and skill development.</p>
P19	<p>I myself have done around 20 courses through Coursera and HEC's DLSEI. But all those courses are not of my subject area that could further my knowledge in that particular area. Therefore, traditional degree has its own significance and cannot be fully replaced by micro-credentials. However, online courses are important in polishing certain writing and speaking skills and also data science and data analysis skills. Students could benefit from courses on English writing, speaking and presenting and also for learning data science through python and other tools. Introductory or basic courses on Artificial intelligence, graphic design, interpersonal skills and google docs could really help in polishing different skill sets.</p>
P20	<p>Micro-credentials as I said, are very beneficial and very important in this era of uncertainties. In the times of emergency micro-credentials can play a vital role to continue educational activities and learning.</p>

Seeing the above views shown in table 6, it can be said that the functions of traditional degrees and micro-credentials in education are different yet complimentary. Research and theoretical understanding are strengthened by degrees, which offer thorough, in-depth knowledge in a variety of areas. On the other hand,

micro-credentials emphasize skill-specific, targeted learning, providing flexibility and rapid access to real-world knowledge. Their value lies in their ability to encourage lifelong learning, improve employability, and meet changing market demands. Learners can get multidisciplinary knowledge, international exposure, and certificates that are recognized by employers worldwide through platforms such as Coursera.

The above data shows that micro-credentials are particularly important in the fast-paced, skill-driven economy of today, where businesses are calling for more and more knowledge in fields like machine learning, artificial intelligence, and data analytics. Online learning is more flexible and accessible than traditional degrees, but it lacks the in-person interactions and real-world experience that traditional degrees give. Combining online and conventional learning methods can result in a successful educational strategy. By ensuring that students get both theoretical knowledge and practical skills, this integration equips them for the challenges that lie ahead in a highly competitive global workforce. In addition, P12, talks about Outcome Based Education (OBE) which promotes continuous learning and encourages students to take another chance if they fail in the first attempt to learn something.

Table 7. Skill Development and Employability

Participants	Responses
P1	It has a lot of contribution. If we see the recent trends, employability in jobs is based on skills. If we see internationally, they do not give that much weightage to degrees that they give to a skill-set. It is quite helpful in the new trend of freelancing and remote contract buyers perspective in Pakistan. It is also useful for our economy. So this is something that we really need.
P2	Coursera offered courses are from international universities, so their content is a bit different from the traditional courses. Thirdly, because certifications are also involved in it, so skills are developed in it. To be very honest, micro-credentials can have a huge contribution in skill development and employability. Especially, as we have lots of different short courses such as MS Office, Artificial Intelligence (AI), different computer programming related short courses etc. So these are such skills that we cannot inculcate in students through traditional teaching. They can easily get these skills through these short online courses. In modern era it is more important to leverage technology in your favor. How you can manage presentations development, how you can better use big data. Currently only Computer Science students know these things. But, if our Business Administration students also get these courses and they get to know that how big data can be used, so they will get a different edge from the traditional degree. This is inevitable in today's job market. Because everybody is getting a degree. But, what you bring on the table different from the others is very demanding.
P3	It is a very good option. I am myself doing these online courses. I personally know many students who developed their skills through it and afterwards started their earnings through freelancing. As we are a Computer Science oriented university, there is a massive potential for our field in Coursera offered courses. Our many students did these courses and earned from them. HEC has officially appreciated us on this. In employability I do not know if it will be helpful or not, but mostly people go for freelancing after doing these courses. For a job, a degree is required in Pakistan. I don't will it help in that or not. But if a person already doing a job, she/he should take she/he took her/his respective course from Coursera which can help them in main course and can increase their employability chances.
P4	Micro-credentials help people learn specific skills that employers want. They can make it easier to get a job or improve in your current role by showing you have the right abilities for the job.
P5	Micro-credentials focus for a specified area only. They improve your short-term skills. While a degree program gives you theoretical knowledge and when you go for employment, you employ that theoretical knowledge then. Whereas, skills certifications train you practically in a particular area. So certifications play a vital role in skill development while degrees play their part in theoretical and research knowledge.
P6	Micro-credentialing provides opportunities for individuals to embrace a culture of lifelong learning. Individuals can remain competitive by continually learning new skills and updating their existing knowledge throughout their careers. This encourages individuals to invest in their own development and employment.
P7	I do not see any other useful method for skill development and employability enhancement other than online courses. Suppose you have develop someone's skills. She/he will go physical or the other way is online. Online learning has two ways: one is learning on Youtube and the other is joining online courses. There are many avenues which students can use to upgrade themselves. Online courses are not affordable for Pakistani students. They charge in dollars. So, we need to develop our own courses for online mode and offer it on cheaper prices with making sure the quality of the content. Also the language of native English speakers is tough to understand for Pakistani students. It is very complicated. We should work on it indigenously. We must fill the gaps that the international online courses leave. Especially in skills development online learning can play a vital role.

P8	With the attachment of traditional learning with different online learning platforms such as Google, IBM, Coursera etc. will play a vital role in skill-set improvement of the students, in the coming future.
P9	It depends on the provided environment from country to country. But these micro-credentials definitely enhance the chances of employability.
P10	In my opinion, when students have extra certificates, their profile looks really good. They might even get called for interviews. But then they have to show their skills. If they don't have the skills, it won't help much.
P11	Micro-credentials have bridged the gap between academic knowledge and practical skills. They have empowered students with relevant competencies that meet industry demands, thereby improving their employability.
P12	Micro-credentials help a lot in skill development and employability. As there are two terms in education. One is pedagogy and one is andragogy. In andragogy, students learn themselves with their own efforts. Teacher only asks them to refer to certain learning sources. As Coursera offers different specific skills, so it plays a vital role in skills development which certainly lead to employability.
P13	Micro-credentials significantly contribute to skill development and employability by offering focused, industry-aligned training. They provide quick, accessible learning opportunities for specific competencies, allowing individuals to acquire targeted skills relevant to evolving job markets. Employers value these credentials as evidence of practical expertise, making individuals more competitive in the workforce. Micro-credentials empower learners to adapt swiftly to industry changes, fostering continuous skill development and enhancing overall employability in a rapidly evolving professional landscape.
P14	It depends upon the definition of micro-credentials that you are taking. If you are referring to micro-credentials in terms of those courses that can replace the original degree courses, in our country there aren't any. I don't know any such university that is practicing it in any single program. For example, a certain university launches certain courses that are a part of curriculum at a certain BS program. When in future a student wants to go for a master's program, they can seek an exemption in that certain course if fulfil the requirements. If we take this definition, then there is nothing in Pakistan like this. On the other hand, if you go on MOOCS like websites such as Coursera and other websites, they play a massive role in skill development. You can access all those courses and content from home that are not available in your country. As a weaker economy and as a developing country we do not have all of the materials or all of the teaching methodologies or skills of those courses that are available online. However, Coursera offers a better opportunity for skill enhancement and it is credible than the other learning websites as it partners with credible institutions and entities and provides valid certificates to the learners.
P15	Today when we say that internationally recognizable micro-credentials or skill-set. When we got any certification and endorsement that is acceptable in the global market. If I get any certification with the CISCO, or Microsoft, or AWS, or any other organization, which is actually making the associate level certifications, international level certifications, or expert level certifications, you have to select a domain and that makes from the novice person to the introductory level, to intermediate level, until the expert level. So that level actually judge your standing in the market. Similarly the market acceptability is very important. These days every organization which is making the digital transformation in this era, is actually using those credentials for the hiring purpose and to differentiate or discriminate between different vacancies offering and the entries of a number of CVs because there are thousands of CVs of graduated students. The algorithm differentiate different CVs on the basis of the micro-credentials and the experiential learning. Some AI HR systems are also developed that tell the score on the basis of these micro-credentials and experiential learning. So micro-credentials are considered as a continuous learning process.
P16	If it is related to IT, then very well. Industry needs skilled persons. If these short courses offer skills then they are very good. However, soft skills can be learned through these micro-credentials. Even without a degree, these short courses enable a person to earn.
P17	It depends upon the selection of courses and optimized learning of the individuals. If any scholar chooses or select the course as per job or employment condition then the skills developed through these courses serve the purpose absolutely otherwise partially.
P18	Micro-credentials play a crucial role in skill development and employability. Platforms like Coursera provide professional-level content that fosters skill enhancement and empowers individuals to compete in today's job market effectively.
P19	Online courses are important in polishing certain writing and speaking skills and also data science and data analysis skills. Students could benefit from courses on English writing, speaking and presenting and also for learning data science through python and other tools. Introductory or basic courses on Artificial intelligence, graphic design, interpersonal skills and google docs could really help in polishing different skill sets. Specialization courses on graphic designing, amazon web services, e-commerce and digital marketing can benefit people in terms of employability.
P20	Micro-credentials play a key role in the skill development and employability of the students. As many online learning platforms such as Coursera offer high quality online learning to students and other learners.

The above quotes in table 7 reveal that micro-credentials significantly empower employability and skill development through focus and industry-based training. These certificates, however, arm students with job-ready practical skills unlike standard degrees that focus on theoretical knowledge. For example, globally recognized certificates in traditional fields have been adapted onto platforms like Coursera online courses that help people adapt to the changing demands of the workforce such as data science, AI (artificial intelligence), graphic designing, digital marketing etc.

According to the expert views, micro-credentials have emerged most beneficial in Pakistan for freelancing, remote working and augmenting traditional education. They enable learners to pursue global content, develop niche skills and give them an edge over others. Yet, problems such as cost and language barriers persist and highlight the need for locally developed courses. Micro-credentials complement degrees, but never replace them; rather, they offer flexibility and encourage lifelong learning. Moreover, employers are using certifications more and more to assess applicants, and AI driven HR systems are identifying these skills and competencies.

DISCUSSION AND IMPLICATIONS

This study systematically explores the value of micro-credentials within higher education, emphasizing the potential to reshape academic recognition and professional development. Santally et al. (2024) reveal in their study that there is great potential for improving professional development and changing academic recognition through the introduction of micro-credentials in higher education. Micro-credentials are certifications that evaluate certain knowledge and abilities gained through focused educational experiences. The results highlight how important it is to establish organized pathways that link micro-credentials to college credits, which can eventually result in accredited credentials. This link is essential to ensuring that micro-credentials are accepted and incorporated into the larger educational system, which will increase their importance for both employers and students. An environment of continuous learning, improved employability, and tailored educational pathways might all result from the successful integration of micro-credentials, changing the face of professional growth and academic recognition in higher education. The research highlights that micro-credentials offer a flexible and modular approach to learning, allowing students to achieve targeted competencies in a rapidly evolving job market. Micro-credentials offer an open focused on, and readily available approach to learning, allowing students to get and show certain skills rapidly. They are especially useful in fast changing industries like digital and technical skills, wherein traditional education might not keep up with market demands. Micro-credentials enable learners to gain competences recognized by employers by providing small, specialized certifications following brief learning experiences, so increasing their qualifications and flexibility in the job marketplace (Stamatakis et al., 2025). Direct responses from interviewees, as presented in the tables, draw attention to an optimism toward these credentials, particularly in terms of their ability to validate specific skill sets and boost up the chances of employability and earnings.

However, the analysis also reveals challenges that warrant careful consideration. Some interview responses point to uncertainties regarding the standardization of micro-credential frameworks and their alignment with traditional academic qualifications. There is a noticeable tension between the agility of micro-credentials and the established structures of higher education institutions. The data suggest that while micro-credentials provide a bespoke learning experience, their integration must be managed to maintain academic rigor and recognition. Rosenberg & Clayton (2024) argue in their study that maintaining the legitimacy of micro-credentials involves the implementation of strong quality assurance procedures. To make sure that the certifications granted represent true skill acquisition and conform to industry norms, institutions must set up transparent evaluation procedures and continuous improvement initiatives. Higher education institutions urgently need to improve learning opportunities, match labor market demands, establish quality assurance procedures, build strategic alliances, create successful marketing plans, and maintain flexibility in response to future shifts in the field of education. Therefore, the study advocates for a balanced approach that harmonizes innovative credentialing methods with the enduring values and quality assurance mechanisms of higher education.

Moreover, in analyzing the diverse issues regarding the benefits of micro-credentials presented in this study, it becomes evident that the exploration of micro-credentials incorporation envelopes both promising opportunities and pressing challenges. Studying micro-credentials shows encouraging prospects for improving educational accessibility, employability, and inclusivity. Even so, there are still issues with matching these credentials to industry norms and ensuring their acceptance in traditional educational frameworks, which

calls for more study and development of policies (Schutte, 2024). While, on one hand, the integration of micro-level approaches introduces a paradigm in which multiple, context-specific benefits can be harnessed. These benefits include increased operational transparency, accuracy in strategic decision-making, and the potential for a more swift response to evolving market demands. In particular, the granular focus allows decision-makers to address localized issues with data-driven perspectives, thereby presenting and promoting innovation and targeted intervention strategies.

On the contrary, critical scrutiny reveals inherent complexities and potential pitfalls. Micro-credentials are anticipated to play a crucial role in higher education under the ongoing growth scenario. This integration will promote industry partnerships and curriculum evolution, making educational offers more relevant to the demands of the labor market today. However, the collapse scenario draws attention to the serious dangers that institutions face if they don't change with the times. This includes possible employer skepticism about the worth of micro-credentials that could compromise their efficacy and adoption in the labor market (Kir et al., 2024). The pursuit of micro-credentials incorporation, while affording detailed views and perspectives, may also lead to fragmented oversight and an overemphasis on different and distinct components at the expense of overarching organizational coherence. This segmentation can result in challenges related to resource allocation, the sustainability of isolated initiatives, and difficulties in harmonizing localized actions with global strategic objectives. Additionally, the dynamic interaction between micro-level components may introduce unintended systemic risks, as the interdependencies are not always fully understood or controllable, thereby potentially undermining the intended benefits. Both separately and in combination, demographic changes, economic uncertainty, technological advancement, geo-economic fragmentation, and the green transition. These are among the primary factors anticipated to shape and modify the global job market by 2030. The Future of Jobs Report 2025 addresses how these macro-trends affect jobs and skills, as well as the workforce transformation approaches employers intend to implement in response, over the course of the 2025–2030 timeframe. It does this by bringing together the perspectives of more than 1,000 leading global employers, who together represent over 14 million employees across 22 sectors and 55 economies (World Economic Forum, 2025).

Nevertheless, it is also important to acknowledge that while the adoption of micro-credentials incorporation practices is informed by rapidly evolving technological and methodological advancements, its practical implementation demands rigorous analytical frameworks. These frameworks must balance the granularity of local innovations with the necessity for integrated, holistic oversight. Consequently, the theoretical promise of precise interventions must be weighed against the operational challenges that arise from both analytical complexity and organizational adaptation. As is evident in the study of Hoyos & Kloos (2023), it is becoming more widely acknowledged that adopting micro-credentials is an essential way to address the pressing demand for professionals across a range of industries to reskill and upskill. Micro-credentials, that are considerably shorter than regular degrees, are being aggressively included into the offers of educational institutions. But there are some challenges with this integration. It necessitates giving both educational and technological factors considerable thought. For example, creating successful micro-credentials requires choosing relevant learning objectives and content that meet industry demands. Additionally, it is important to switch from conventional paper-based diploma to digital credentials so that employers can quickly verify them and credential holders can share their credentials with ease.

CONCLUSIVE REMARKS

In brief, the study emphasizes that the potential for micro-credentials incorporation is situated at the intersection of opportunity and constraint. The empirical evidence and theoretical discourse presented herein affirm that, when effectively harnessed, micro-credentials integration can substantially enhance targeted decision-making and operational efficiency. However, the attendant risks — particularly the fragmentation of oversight and the emergent systemic vulnerabilities — necessitate a cautious and well-regulated approach.

Future research would benefit from a dual focus: firstly, to develop robust methodologies for synthesizing micro-level data into coherent strategic frameworks, and secondly, to explore the longitudinal impacts of micro-credentials incorporation on organizational performance and adaptability. By bridging the gap between localized empirical insights and broader strategic imperatives, subsequent studies can pave the way for more resilient and dynamically responsive organizational models. Nonetheless, the successful integration of micro-credentials depends on resolving challenges related to standardization, quality assurance, and institutional acceptance.

FUTURE RESEARCH RECOMMENDATIONS

This study thus serves as a call to further explore the potential of micro-credentials incorporation in higher education within a rigorously tested, methodologically sound, and integrative framework, ensuring that its promising benefits can be realized while effectively mitigating its inherent risks.

BIODATA and CONTACT ADDRESSES of AUTHORS



Dr. Muhammad EHSAN is an education professional and researcher from Zhob, Pakistan. He works as a secondary school teacher with the Department of Secondary Education, Government of Balochistan, and also teaches research methodology part-time at Allama Iqbal Open University, Quetta. He enjoys guiding B.Ed. and M.Ed. students through workshops and research assignments. He completed his PhD in Education from the International Islamic University, Islamabad, where he focused on integrating micro-credentials in degree programs in Pakistan. He also holds an M.Phil in Educational Leadership and Management and a Master's in Political Science. Over the years, he has attended many international trainings, including the TEA Fellowship at Virginia Tech, courses in online learning design, digital media, and teaching skills from universities in the U.S., Australia, and Europe. Dr. Ehsan has published research on teaching practices, ICT in classrooms, collaborative learning, and education reforms. He participates actively in conferences and professional networks. He is a founding member and Director of Outreach and Accessibility of the Pakistani American Teachers of English Network (PATEN), working to connect teachers, share resources, and support professional growth. His work combines classroom experience with research to make education more practical and meaningful for students.

Muhammad EHSAN
School Education Department, Government of Balochistan
Address: Balochistan, Pakistan
Phone: +92 334 248 5401
E-mail: ehsankhanquetta@gmail.com



Dr. Fouzia AJMAL has been working at Department of Teacher Education and is currently holding the responsibility of Incharge Academic Affairs at Faculty of Education International Islamic University Islamabad, Pakistan. She is also associated with Institute of Professional Development & IIUI Schools as Consultant. She has got her PhD Education with specialization in Teacher Education from International Islamic University Islamabad. She possesses diversified experience in administration, research and teaching at various levels. She has worked as pre-school and school head which enhanced her administrative skills. She has the privilege of working as Assistant Director, Female Campus, Students Advisor Directorate of Distance Education and Focal Person Academics & Research, Faculty of Social Sciences. Her research interests include pre-service and in-service teacher education and bridging the gaps between theory and practice. Her research is getting space in the national and international journals. She is member of different associations in the field of education and training. She is been guiding research scholars for MS & PhD in different areas of education.

Fouzia AJMAL
International Islamic University, Islamabad, Pakistan
Address: Department of Teacher Education, Faculty of Education, Room C-004, Fatima Tuz Zahra Block, International Islamic University, Sector H-10, Islamabad, Pakistan
Phone: +92-336-5413721
E-mail: fouzia.ajmal@iiu.edu.pk

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