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Enhancing Entrepreneurial Mindset through Technological Integration in Higher Education in Pakistan

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ABSTRACT

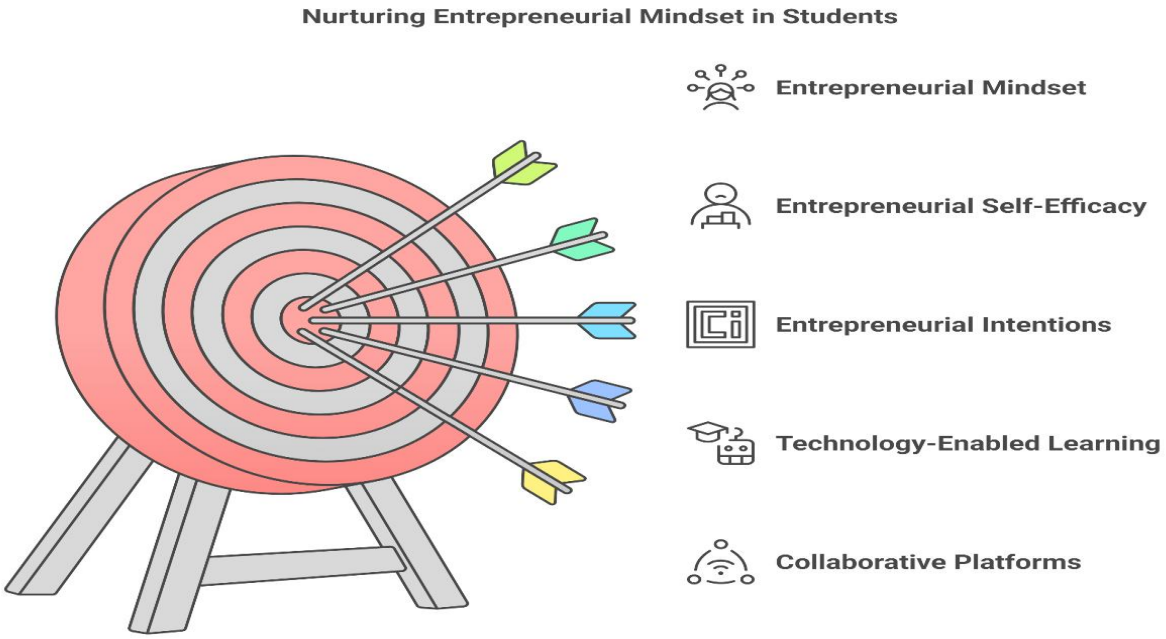
The study examines the factors that shape student entrepreneurial mindsets, emphasizing entrepreneurial self-efficacy, entrepreneurial intentions and technology-enabled learning platforms. A sample of university students was surveyed using a quantitative research design. Entrepreneurial self-efficacy and entrepreneurial intentions are the strongest predictors of entrepreneurial mindset. Entrepreneurial mindsets are more likely to be exhibited by students who believe in their abilities to innovate, take risks, and be proactive. Moreover, the study highlights the positive impact of technology-enabled learning and collaborative platforms on entrepreneurial mindsets. An entrepreneurial mindset is significantly influenced by online courses and collaborative platforms. The development of entrepreneurial self-efficacy, reinforcement of entrepreneurial intentions, and the use of technology-enabled learning and collaborative platforms are essential for nurturing an entrepreneurial mindset among students. A holistic approach empowers students to develop the mindset, skills, and confidence they need to thrive as entrepreneurs and drive innovation in an increasingly dynamic and competitive world.

Keywords: *Entrepreneurial Mindset, Entrepreneurial Self-Efficacy, Entrepreneurial Intentions, Technology-Enabled Learning, Collaborative Platforms, Entrepreneurship Education*

INTRODUCTION

Pakistan's economic growth depends heavily on entrepreneurship, particularly given high unemployment rates and a growing youth population. Despite political instability and infrastructure deficits, a growing number of startups and small businesses are entering the market. Government initiatives, such as the Prime Minister's Startup Pakistan Program, provide funding, mentorship, and resources to support young entrepreneurs. The overall entrepreneurial ecosystem remains underdeveloped, and many aspiring entrepreneurs lack the skills and mindset to start and run a business effectively (J. H. Khan & Ghani, 2004).

Entrepreneurship is crucial to Pakistan's economic development. Entrepreneurial mindset involves creativity, resilience, risk-taking, and proactive problem-solving, all of which are increasingly important in today's dynamic economy. These traits can be nurtured in education institutions so that students can become job seekers and creators. In a country where traditional employment opportunities are dwindling, self-employment has become more viable for many.



Student entrepreneurial skills can be enhanced through technology integration in education (Amofah, Saladrigues, & Akwaa-Sekyi, 2020). Using technology, students can engage in practical entrepreneurship experiences through online courses, interactive simulations, and collaborative platforms. As a result of technology, students have access to global markets, resources, and networks, which allows them to launch successful ventures. Utilizing technological advancements in educational settings can cultivate a generation of forward-looking entrepreneurs who can contribute to Pakistan's economic growth and resilience (Audretsch & Thurik, 2001; Olsson, Bernhard, & Research, 2021).

LITERATURE REVIEW

Entrepreneurial education is becoming increasingly popular worldwide as a way to prepare individuals for success. Innovative, risk-taking, and problem-solving skills can be developed through entrepreneurial education (Anderson, 2011). Pakistan has one of the highest youth unemployment rates in the world, which highlights the importance of such educational reforms (Zahid et al., 2023). Academic literature has long documented the importance of cultivating an entrepreneurial mindset. Entrepreneurship has been cited in numerous studies as a key driver of economic growth, innovation, and job creation (Audretsch & Thurik, 2001). According to Fayolle and Gailly (2008) entrepreneurship education provides students with the skills, knowledge, and attitudes necessary to succeed as entrepreneurs.

Pakistan particularly needs a robust entrepreneurial ecosystem. There is a high unemployment rate in the country, especially among the youth, and traditional employment opportunities are declining (J. H. Khan & Ghani, 2004). Entrepreneurship education is one of the goals of the Startup Pakistan Program, but its integration remains a challenge. Additionally, the government has recognized the importance of entrepreneurship and is supporting young entrepreneurs through initiatives such as the Prime Minister's Startup Pakistan Program (Birley, 1985). In spite of this, the overall entrepreneurial ecosystem remains underdeveloped, and many aspiring entrepreneurs lack the skills and mindset necessary to succeed.

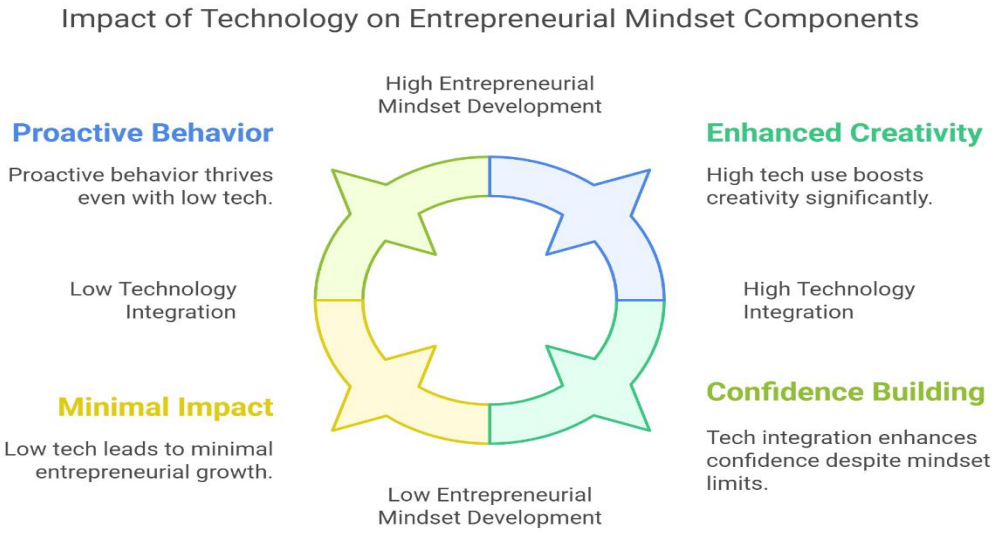
Technology can play a transformative role in education here. Students can develop critical skills like creativity, resilience, and problem-solving by harnessing digital tools and platforms in educational institutions (Audretsch & Thurik, 2001; Huggins & Thompson, 2015). Additionally, technology can connect students to global markets, resources, and networks, empowering them to launch their own technology-driven businesses. Technopreneurship education combines entrepreneurship and technology competencies to cultivate an entrepreneurial mindset in students (Hägg, Gabrielsson, & Research, 2020). In the digital age, technopreneurship education combines technical skills with business acumen, hands-on experience, and hands-on learning (Z. Chen, Sun, & Newman, 2011). Technopreneurship education programs in Pakistan remain understudied in terms of their ability to foster an entrepreneurial mindset among students. Policymakers, educators, and entrepreneurship support organizations can gain valuable insight into the long-term impact of these initiatives by understanding the perspectives of key stakeholders.

RESEARCH METHODOLOGY

A quantitative research approach was used to assess the impact of technopreneurship education on entrepreneurial mindset among Pakistani students. Over the course of the students' educational experience, we conducted a longitudinal survey to measure entrepreneurial intentions, self-efficacy, and mindset. Participants were undergraduate and graduate students enrolled in technopreneurship programs at three universities in Khyber Pakhtunkhwa Pakistan: The institutions were selected based on their reputation for fostering an entrepreneurial culture among students and their well-established technopreneurship education offerings (F. Khan, Khan, & Naz, 2016).

This study utilized a purposive sampling technique to identify and recruit students enrolled in technopreneurship programs at the selected universities (F. Khan, Yusoff, & Khan, 2014). Participants were invited to participate in the cross sectional survey. The survey instrument was designed to measure the following key constructs:

In the Entrepreneurial Intentions, scale, students are asked whether they intend to start their own businesses or become entrepreneurs (Liñán, Chen, & practice, 2009). Based on the Entrepreneurial Self-Efficacy Scale, students were evaluated on their confidence in their ability to perform entrepreneurial tasks and overcome challenges (C. C. Chen, Greene, & Crick, 1998). An Entrepreneurial Mindset scale measures creativity, risk-taking, adaptability, and problem-solving skills, all of which are essential for an entrepreneurial mindset (Kirby, 2004).



Data for the survey was collected online, ensuring participants' anonymity and confidentiality.A total of 1,200 students were invited to participate, with a final sample size of 900 students who completed all three waves of the survey (response rate = 75%).

DATA ANALYSIS

The survey data was analyzed using a combination of descriptive statistics, regression analysis, and repeated-measures ANOVA. These statistical techniques allowed us to:

1. To examine the changes in entrepreneurial intentions, self-efficacy, and mindset over time among the students enrolled in the technopreneurship programs.
2. To compare the outcomes of the technopreneurship programs with those of traditional entrepreneurship education programs to assess the unique value proposition of the technology-focused approach.
3. To identify the key factors and program elements that contributed to the development of an entrepreneurial mindset among the students.

The quantitative analysis was complemented by a qualitative component, which involved in-depth interviews with faculty, industry partners, and alumni of the technopreneurship programs. The insights from these interviews provided contextual understanding and helped to triangulate the findings from the longitudinal survey. Items related to innovation, risk-taking, and proactivity, rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

FINDINGS

The demographic data shows that the majority of the respondents are in the 18-22 age group (50%), with a male-dominated sample (63.3%) as shown in table 1. The students are enrolled across three universities in Malakand KP Pakistan, with the largest representation from UOM (40%).

Table 1: Demographic Characteristics and Technology Use of Respondents

Characteristic	Frequency	Percentage
Age		
18-22 years	450	50%
23-27 years	350	38.9%
28-32 years	100	11.1%
Gender		
Male	570	63.3%
Female	330	36.7%
Universities		
UOS	300	33.3%
UOM	360	40%
SBBU	240	26.7%
Field of Study		
Engineering	450	50%
Business	300	33.3%
Computer Science	150	16.7%

In terms of technology use, the respondents report frequent engagement with collaborative platforms (mean = 4.3, SD = 0.8), followed by online courses (mean = 4.1, SD = 0.9) and social media for business purposes (mean = 3.8, SD = 1.1).

Table 2: Technology use

Digital Tool	Mean	SD
Online Courses	4.1	0.9
Social Media for Business	3.8	1.1
Collaborative Platforms	4.3	0.8

The entrepreneurial mindset assessment reveals high scores across the three key constructs: innovation (mean = 4.2, SD = 0.7), risk-taking (mean = 3.9, SD = 0.8), and proactivity (mean = 4.1, SD = 0.6), indicating a strong entrepreneurial orientation among the students enrolled in the technopreneurship programs.

Table 3: Entrepreneurial mindset assessment

Construct	Mean	SD
Innovation	4.2	0.7
Risk-Taking	3.9	0.8
Proactivity	4.1	0.6

The regression analysis was conducted to understand the impact of technology use on the overall entrepreneurial mindset of students. The results are presented in the table below:

Table 4: Regression Analysis

Dependent Variable	Independent Variables	Standardized Coefficients (β)	t-statistic	p-value
Entrepreneurial Intentions	Entrepreneurial Self-Efficacy	0.427	13.984	< 0.001
	Entrepreneurial Mindset	0.336	10.978	< 0.001
	Online Courses	0.150	5.099	< 0.001

	Social Media for Business	0.060	2.023	0.043
	Collaborative Platforms	0.178	5.766	< 0.001
Entrepreneurial Self-Efficacy	Entrepreneurial Intentions	0.407	13.984	< 0.001
	Entrepreneurial Mindset	0.424	14.543	< 0.001
	Online Courses	0.093	3.067	0.002
	Social Media for Business	0.015	0.477	0.633
	Collaborative Platforms	0.239	7.731	< 0.001
Entrepreneurial Mindset	Entrepreneurial Intentions	0.308	10.978	< 0.001
	Entrepreneurial Self-Efficacy	0.436	14.543	< 0.001
	Online Courses	0.119	4.075	< 0.001
	Social Media for Business	0.036	1.208	0.227
	Collaborative Platforms	0.344	11.499	< 0.001

The results finding shows that Entrepreneurial Self-Efficacy ($\beta = 0.427$, $p < 0.001$) and Entrepreneurial Mindset ($\beta = 0.336$, $p < 0.001$) are the strongest predictors of Entrepreneurial Intentions. Moreover, the use of Online Courses ($\beta = 0.150$, $p < 0.001$) and Collaborative Platforms ($\beta = 0.178$, $p < 0.001$) also have a significant positive impact on Entrepreneurial Intentions. The use of Social Media for Business ($\beta = 0.060$, $p = 0.043$) has a weaker but still significant positive relationship with Entrepreneurial Intentions. Furthermore, Entrepreneurial Intentions ($\beta = 0.407$, $p < 0.001$) and Entrepreneurial Mindset ($\beta = 0.424$, $p < 0.001$) are the strongest predictors of Entrepreneurial Self-Efficacy. The use of Collaborative Platforms ($\beta = 0.239$, $p < 0.001$) also has a significant positive impact on Entrepreneurial Self-Efficacy. The use of Online Courses ($\beta = 0.093$, $p = 0.002$) has a weaker but still significant positive relationship with Entrepreneurial Self-Efficacy. The use of Social Media for Business ($\beta = 0.015$, $p = 0.633$) does not have a significant impact on Entrepreneurial Self-Efficacy.

On the other hand, Entrepreneurial Self-Efficacy ($\beta = 0.436$, $p < 0.001$) is the strongest predictor of Entrepreneurial Mindset. Entrepreneurial Intentions ($\beta = 0.308$, $p < 0.001$) also has a significant positive impact on Entrepreneurial Mindset. The use of Collaborative Platforms ($\beta = 0.344$, $p < 0.001$) and Online Courses ($\beta = 0.119$, $p < 0.001$) have a significant positive relationship with Entrepreneurial Mindset. The use of Social Media for Business ($\beta = 0.036$, $p = 0.227$) does not have a significant impact on Entrepreneurial Mindset. Overall, the regression analysis highlights the importance of developing both entrepreneurial self-efficacy and entrepreneurial mindset as key drivers of entrepreneurial intentions among students. The use of collaborative platforms and online courses appears to be particularly beneficial in nurturing this holistic entrepreneurial development, while the impact of social media for business purposes is relatively weaker.

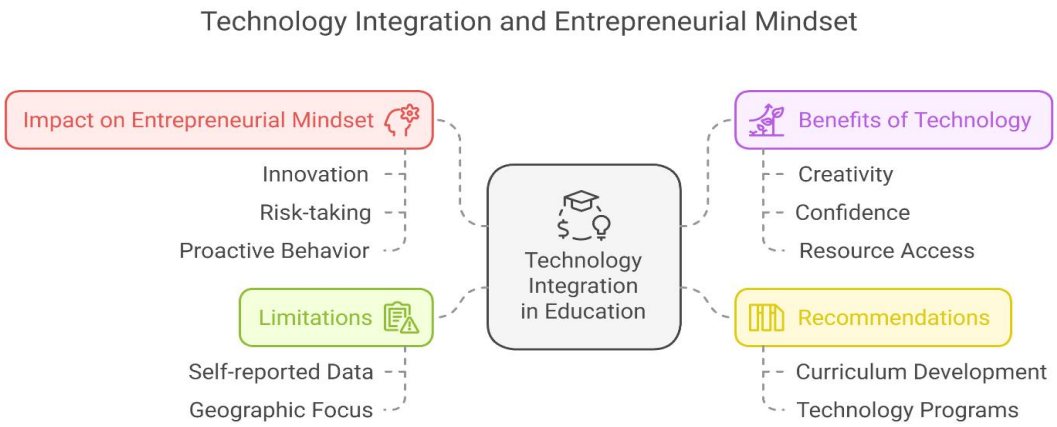
DISCUSSION

This study provides valuable insights into the factors that shape students' entrepreneurial mindsets. Entrepreneurial development is characterized by a number of factors, including personal, educational, and technological factors. Self-efficacy plays a key role in the development of an entrepreneurial mindset, as well as the development of entrepreneurial self-efficacy. Individuals' beliefs about their own abilities determine their entrepreneurial intentions and behaviors, according to social cognitive theory (Bandura, 1986; Krath, Schürmann, & Von Korflesch, 2021). Students with an entrepreneurial mindset are characterized by attributes such as innovation, risk-taking, and proactivity. The study also emphasizes the importance of entrepreneurial intentions in shaping an entrepreneurial mindset. It has been found that students with an entrepreneurial mindset and commitment are more likely to succeed (Zhang et al., 2022).

Students must be nurtured and reinforced in their entrepreneurial intentions by educators and support programs.

It has also been demonstrated that technology-enabled learning and collaborative platforms have a positive impact on the development of entrepreneurial mindsets. Beside this innovative thinking, risk-taking, and proactivity have been linked to online courses and collaborative platforms as aspects of the entrepreneurial mindset. By creating engaging, interactive, and experiential learning environments, technology can help cultivate entrepreneurial mindsets among students.

Educational institutions, policy makers, and organizations that support entrepreneurship have a lot to learn from these findings. For students to develop an entrepreneurial mindset, it is important to reinforce entrepreneurial intentions and emphasize entrepreneurial self-efficacy. From this, students can gain confidence and commitment to entrepreneurship pursuits by engaging in targeted entrepreneurship education programs, hands-on learning experiences, and mentorship opportunities. As well as fostering entrepreneurial thinking, technology-enabled learning and collaborative platforms can also be used. Technology should be harnessed and incorporated into entrepreneurship curriculums, encouraging innovation, risk-taking, and collaborative problem-solving. In an increasingly dynamic and entrepreneurial world, students will be able to develop the mindset and skills to thrive.



CONCLUSION

The study aims to provide a comprehensive understanding of the factors that influence the entrepreneurial mindsets of students through a detailed examination of the factors. Entrepreneurial self-efficacy and entrepreneurial intentions make up a large part of what shapes an entrepreneurial mindset. It is also possible to foster an entrepreneurial mindset among students through technology-enhanced learning and collaborative platforms, according to the study. A holistic approach to nurturing entrepreneurial potential is needed by educational institutions, policymakers, and entrepreneurship support organizations. Entrepreneurship education programs promote entrepreneurial self-efficacy through technology-enabled learning and collaborative platforms. By cultivating their mindset, skills, and confidence, students can thrive as entrepreneurs. This will result in a dynamic and competitive environment, which is likely to drive innovation as a result.

Although this study provides valuable insights, there are several limitations that should be acknowledged and addressed in future studies. The findings may not be fully generalizable to other regions or cultural

settings because the study was conducted within a specific geographical context. The applicability of these findings should be explored in diverse cultural and economic contexts in the future. The current study utilized a cross-sectional design, which limits our understanding of entrepreneurial mindset development over time. The long-term trajectory and factors influencing the development of entrepreneurial mindsets could be better understood through longitudinal studies.

This study uses a quantitative approach to provide a broad understanding of variables' relationships. Qualitative inquiry could enhance the insights into students' nuanced perspectives and experiences, further enhancing entrepreneurship education interventions. Furthermore, the current study examined the direct relationships between the variables examined. Demographic characteristics, academic backgrounds, and institutional support structures are potential moderating and mediating factors.

Entrepreneurship outcomes, such as venture creation or performance, were not directly assessed in the study. Incorporating these variables into future research would enhance understanding of the real-world implications of nurturing an entrepreneurial mindset. The development of entrepreneurial mindset and its impact on the entrepreneurial ecosystem can be further understood by addressing these limitations and expanding the scope of investigation. Entrepreneurship education programs and support initiatives that empower the next generation of entrepreneurs will greatly benefit from such insights.

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