

Are Universities Preparing Students for the 21st Century? A Survey on Students' Perceptions and Readiness

Insaf Ali Siming¹, Shazma Nandwani², Faheemuddin Shaikh³ and Raheela Insaf⁴

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Abstract

In the 21st century, universities are expected to equip students with essential skills such as critical thinking, problem-solving, digital literacy, creativity, and collaboration to prepare them for the rapidly evolving job market. This quantitative study investigates students' perceptions regarding the absence of these competencies in higher education curricula and pedagogies. A structured survey was administered to 300 undergraduate students from six disciplines at Benazir Bhutto Shaheed University Layari, and data were analyzed using SPSS. The results indicate a strong agreement among students that universities do not adequately emphasize experiential learning, interdisciplinary approaches, or real-world applications. The findings highlight the need for curriculum reforms, faculty development programs, and modern pedagogical strategies to align university education with 21st-century demands. The study contributes to the discourse on higher education reform, emphasizing the importance of innovative teaching methodologies, digital integration, and skill-based learning to enhance student readiness for future careers. Future research should explore effective interventions and policy measures to address these gaps.

Keywords: 21st-Century Skills, Higher Education, Student Perceptions, Curriculum Reform.

Introduction

Recent technological advancements in recent decades have catalyzed the fourth industrial revolution, also known as Industry 4.0 (Fayaz et al., 2023). Industry 4.0 is characterized by technologies such as smart manufacturing plants, artificial intelligence, cyber-physical systems, and the Internet of Things, which have decentralized decision-making processes and disrupted global labor markets. These disruptions include the replacement of existing occupations, the creation of various new positions, and, in many cases, a redefinition of human roles in the workplace (Zulkifi et al., 2022). The need for routine jobs has decreased, whilst the demand for service and knowledge-based professions has increased.

A primary focus of government policy agendas worldwide is to equip future workers for the changing landscape of employment. Consequently, educators, researchers, and politicians are charged with identifying and cultivating the abilities required to address these changes. These competencies have been designated by different labels, including 21st-century skills, future skills, digital competencies, soft skills, and survival skills. In the following sections of this document, we

¹Chairman Department of English, QUEST Nawabshah. Corresponding Author Email: simingrahila@yahoo.com

²PhD Scholar, Greenwich University, Kkarachi.

³Lecturer English, Department of English, Shaheed Benazir Bhutto University, Shaheed Benazir Abad.

⁴Graduate in English, Shah Abdul Latif University Khairpur.



will denote them by the prevalent term in the literature, 21st century skills (Noorani & Lashari, 2023).

A new and unique educational paradigm has arisen post-pandemic, characterized by its leadership and instructional methods (online, blended, face-to-face) and its content emphasis (e.g., subject knowledge and/or broader competencies such as professional digital competence, critical thinking, computational thinking, digital citizenship, deep learning, problem-solving, and collaborative learning (Lashari et al., 2023). The focus on digital competence and 21st-century skills was considerable prior to the epidemic, but it has definitely accelerated their acknowledgement and significance (Howard & Tondeur 2023). The epidemic has underscored the quality of online and blended learning, as well as the importance of digital technology and digital literacy, in the realm of educational transformation (Olofsson, Lindberg, & Fransson, 2021).

Amid the complex educational environment termed 'a new normal,' research has revealed instances of inventive and inspiring teaching and learning techniques throughout the pandemic (Teo et al., 2021). The findings suggest that teacher educators, teachers, student teachers, and students have adapted to progressively digital contexts (Ferdig & Pytash, 2021; Khlaif et al., 2024). These findings indicate that educational institutions worldwide have been revising and enhancing educational policies and curricula to integrate digital competence and 21st-century skills as a formal element of national compulsory education for two decades (Siddiq et al., 2024; Olofsson et al., 2021; OECD, 2019). Research demonstrates considerable heterogeneity in the scope, subject matter, and emphasis of instruction in essential competencies, alongside the capabilities and skills of both educators and learners within these areas (Howard et al., 2021; Siddiq et al., 2016).

Olofsson et al. (2021) assert that variations may occur due to the inherently malleable, temporal, and multidimensional nature of digital competence, which embodies a concept "that carries an intended meaning, which can be translated and negotiated relative to national educational needs and beliefs and can be enacted in diverse manners within specific local practices" (p. 323). The concept of 21st-century abilities is often viewed as broad, including several competency areas like critical thinking, creativity, problem-solving, computational thinking, collaboration, and ICT literacy. It is characterized as "the skills, knowledge, and expertise that students must acquire to thrive in both professional and personal spheres – a synthesis of content, knowledge, specific skills, expertise, and literacies" (Greenhill, 2010). Similarly, like digital competence, 21st-century skills are perpetually evolving in response to social transformations and requirements (Siddiq et al., 2024), integrating emerging fields of proficiency, like AI (artificial intelligence) literacy and algorithmic literacy.

Problem Statement

Though global labor markets, technology, and social issues are changing quickly, many still question whether universities are sufficiently preparing their students with the skills they need for success in the 21st century. Many studies show a growing disparity between academic preparation and the abilities required by modern businesses, especially in fields including critical thinking, digital literacy, communication, problem-solving, and flexibility. Although universities tend to stress theoretical knowledge, students are more and more voicing a lack of readiness for practical applications, cross-disciplinary cooperation, and future job markets impacted by automation and innovation. Furthermore, the inclusion of 21st-century learning concepts into university courses differs between universities and fields of study, which affects student experiences and results (Silva, 2009). This disparity begs for issues regarding the responsiveness of higher education institutions to global changes and the degree to which students feel prepared to negotiate with an

unpredictable and fast-changing society. Thus, it is vital to investigate university programs' influence on 21st-century abilities and students' views of their preparation. Knowing these views is essential not only for matching educational policies and curriculum with future needs but also for enabling students to actively participate with the intricate problems of the current day.

Research Questions

RQ: What are the perceptions of students for 21st-century skills development during their graduation?

RQ: In what way do students evaluate the efficacy of their university curriculum and pedagogical approaches in preparing them for future employment and real-world challenges?

Literature Review

The fundamental aim of education should be to enhance the comprehensive training of individuals and to elevate the quality of life within society. The 2020 report on the Sustainable Development Goals (SDGs) of the United Nations (UN) Agenda 2030 indicates that the pursuit of inclusive, equitable, and quality education, as well as the promotion of lifelong learning for all (SDG4), has been adversely affected by prolonged school and university closures due to COVID-19, thereby influencing educational outcomes (Ichsan, 2023). Despite numerous institutions providing education via virtual classrooms, internet connection remains constrained for many pupils. Moreover, effective instruction relies on the computer proficiency of educators, educational administrators, and guardians.

Comprehensive educational framework models enable the observation and assessment of the competences necessary within each field from various dimensions, including technological, pedagogical, contextual, and humanistic perspectives. The 21st-century frameworks offer tools to discern the skills pupils need for future employment; thus, educators must evaluate if existing competences and pedagogical approaches are structured to fulfill this objective (Lashari et al., 2023).

The Partnership for 21st Century Skills is a collaborative organization consisting of governments and businesses that developed a framework for fostering skills, competencies, and mindsets essential for success in the workplace and contemporary society. It delineates three categories of competencies: (1) learning skills (creativity and innovation, critical thinking, problem-solving, communication, and collaboration); (2) literacy skills (information literacy, media literacy, ICT literacy); and (3) life skills (flexibility and adaptability, initiative and self-direction, social and intercultural skills, productivity and accountability, leadership and responsibility) (Örtengren & Olofsson, 2024). One of the more vital skills today is complicated reasoning, which requires professionals to contemplate how to traverse an evolving reality. Rehman, Lashari, and Abbas (2023) advocate for transcending scientific reasoning to include systems thinking, critical thinking, creative thinking, and scientific thinking to develop novel solutions for societal issues.

The Fourth Industrial Revolution (4IR) is defined by transformative technologies, methodologies, and practices. The three most essential technologies are artificial intelligence (AI), machine learning (ML), and algorithms (Van et al, 2017). Integrating these technologies necessitates the modernization of educational systems, beginning with classroom organization and management, assessment, pedagogy, ethics, and professional development; additionally, the pandemic has introduced further challenges that demand intricate reasoning, communication, and remote global leadership capabilities.

A complete analysis of curriculum is essential to harmonize educational objectives with the soft and technical capabilities demanded by the Fourth Industrial Revolution, thereby enabling students to fully recognize their talents. Voogt and Robin (2012) performed a systematic literature review (SLR) concentrating on research pertaining to 21st century skills, pedagogy, evaluation, assessment, learning sequences, and curriculum development. The writers analyzed the components of Education 4.0 that illustrate the necessity to reevaluate disruptive technology and hybrid classroom methodologies in the 21st century. The authors proposed that teacher training programs integrate these abilities into their curricula, and that advice be offered to synchronize technical, pedagogical, and disciplinary components with innovative methodological approaches to cultivate 21st-century talents in students (Martin et al., 2023). Determining the essential competencies for Education 4.0 training significantly enhances training potential. Additional SLR studies have informed curriculum design and teacher training, prompting inquiries on the assessment of the technological and pedagogical components best suitable for skill development. The World Economic Forum's 2021 report delineates the principal post-pandemic social challenges, including harsh weather, mortality from illnesses, failure of climate action, environmental degradation, digital disparity, cyber vulnerabilities, and crises in lifestyles. It underscores that the disparity between the affluent and the impoverished will expand if access to technology and resources remain unequal (Gomez et al., 2023). Despite the commendable efforts of exceptional nations in fostering creativity, collaboration, and resolve, the majority have had difficulties in crisis management throughout the worldwide epidemic. Four essential response domains to the problems posed by COVID-19 are institutional authority, risk finance, information collection and dissemination, and resources and vaccinations.

21st Century Skills Required for University Graduates

Twenty-first century skills are characterized as the competencies required to fulfill the needs of employment, education, and commerce in the 21st century, following the fourth industrial revolution. These competencies transcend fundamental reading, numeracy, and technical abilities and signify the necessity for individuals to collaborate with emerging technology or execute activities that are not subject to automation (González-Salamanca, Agudelo, & Salinas, 2020).

Scholarly research empirically grounded in the definition of 21st-century skills remains in its infancy, with only a limited number of reviews undertaken in this domain. González-Pérez and Ramírez-Montoya, (2022) examined curriculum frameworks for imparting 21st-century skills. They noted a level of theoretical consensus on talents and their significance, although minimal convergence in practical and policy ramifications. Researchers have performed a systematic review of abilities pertinent to the 21st century (Lashari et al., 2023; Bushra et al., 2024). They selected seven fundamental skills and subsequently conducted a systematic review examining the causes of these basic abilities and digital competencies (Kennedy & Sundberg, 2020; Buriro et al., 2023). Numerous meta-analyses have been performed to examine the instruction of 21st-century abilities in certain subject areas (e.g., mathematics, science, and creativity) or educational environments (early childhood, K-12, undergraduate). The approaches employed in these evaluations (meta-analyses and systematic reviews) were suitable for addressing contextual or quantitative research inquiries regarding skill identification and acquisition. Nevertheless, literature is deficient in comprehending the intellectual framework of academic research in the domain, which might be elucidated through bibliometric analysis (Gut 2010).

Teacher education institutes globally were compelled to swiftly switch to emergency remote teaching (ERT) practices enabled by digital technology (Ryberg, 2021). Nonetheless, the

pandemic was indifferent to the existing proficiency of teacher educators in professional development competencies or their prior experience with digital technology in pedagogy (Bonk, 2020).

Methodology

This quantitative research investigates whether universities are effectively preparing students for these challenges by analyzing the perceptions and readiness of undergraduate students at Sindh Madressatul Islam University, Karachi. A sample of 300 students was selected from diverse departments, including Software Engineering, Education, Media and Communication Studies, Business Administration, Accounting and Finance, and English. The study employed a structured survey to collect data on students' self-assessed competencies, their experiences with skill-based learning, and their views on the university's role in equipping them for the demands of the modern workforce. The collected data was analyzed using SPSS to identify patterns, correlations, and statistical significance in students' responses.

Results

Table 1: Demographic Characteristics of Participants

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	150	50.0
	Female	150	50.0
Age Group	18–20 years	120	40.0
	21–23 years	140	46.7
	24 years and above	40	13.3
Department	Computer Science	50	16.7
	Education	50	16.7
	Education	50	16.7
	Business Administration	50	16.7
	Commerce	50	16.7
	Information Technology	50	16.7
Year of Study	First Year	75	25.0
	Second Year	75	25.0
	Third Year	75	25.0
	Fourth Year	75	25.0

Table 1 presents the demographic characteristics of the 300 undergraduate students who participated in this study at Sindh Madressatul Islam University, Karachi. The sample included an equal distribution of male (50.0%) and female (50.0%) respondents. Most participants were between 21–23 years old (46.7%), followed by those aged 18–20 years (40.0%), and a smaller proportion aged 24 years and above (13.3%). Students were selected from six different academic disciplines, with equal representation (16.7% each) from Computer Science, Education, English, Business Administration, Commerce, and Information Technology. Participants were also evenly distributed across the four academic years, with 25.0% from each level (First, Second, Third, and Fourth Year).

Table 2: Survey item, mean and its standard deviation

Item No.	Survey Item	Mean (M)	St Dev (SD)
1	Critical thinking is not adequately emphasized in university courses.	4.32	0.87
2	Problem-solving skills are not systematically integrated into the curriculum.	4.28	0.91
3	There is a lack of emphasis on creativity and innovation in university teaching.	4.35	0.89
4	Digital literacy training is insufficient in my university.	4.21	0.95
5	Universities fail to equip students with real-world problem-solving experiences.	4.38	0.88
6	Collaboration and teamwork skills are not adequately developed in university courses.	4.30	0.86
7	Communication skills are not a focus in university assessments.	4.15	0.92
8	Leadership development opportunities are lacking in university programs.	4.40	0.85
9	There is insufficient focus on adaptability and flexibility in learning.	4.22	0.89
10	My university does not effectively integrate technology into teaching methods.	4.17	0.94
11	Entrepreneurial thinking is not encouraged in university courses.	4.26	0.87
12	Data analysis and research skills are not emphasized in my program.	4.10	0.96
13	Universities do not prepare students for the demands of the digital economy.	4.33	0.91
14	There is a lack of experiential learning, such as internships and real-world projects.	4.45	0.84
15	My university does not offer sufficient training in self-directed learning.	4.19	0.90
16	Universities focus more on rote learning than on analytical thinking.	4.37	0.89
17	The assessment methods used do not measure 21st-century skills effectively.	4.31	0.88
18	Universities should integrate industry-based skills training into curricula.	4.50	0.83
19	Ethical decision-making and social responsibility are not emphasized in university courses.	4.27	0.91
20	My university does not provide adequate exposure to global perspectives.	4.20	0.93
21	Creativity and innovation are not rewarded in university assessments.	4.32	0.86
22	The curriculum does not prepare students for rapidly changing job markets.	4.36	0.89
23	My university lacks interdisciplinary learning opportunities.	4.29	0.91
24	Time management and organizational skills are not emphasized in university education.	4.15	0.95
25	Universities should integrate soft skills training alongside technical knowledge.	4.49	0.82
26	The university does not encourage students to think critically about social issues.	4.18	0.92
27	Faculty members lack professional development in modern teaching methodologies.	4.22	0.94
28	There is a lack of research-based and inquiry-driven learning approaches.	4.34	0.87
29	My university does not adequately prepare students for leadership roles.	4.41	0.85
30	Universities need to reform their curricula to align with 21st-century skill demands.	4.55	0.81

Table 2 presents the students' perceptions regarding the absence of 21st-century skills in university curricula and pedagogies. The results indicate that students strongly agree with the notion that universities do not adequately emphasize critical competencies required for the modern workforce.

Among the highest-rated concerns were the need for curriculum reform to align with 21st-century skill demands ($M = 4.55$, $SD = 0.81$) and the integration of industry-based skills training ($M = 4.50$, $SD = 0.83$), highlighting the perceived disconnect between academia and real-world professional requirements. Additionally, students expressed concerns over the lack of experiential learning opportunities, such as internships and real-world projects ($M = 4.45$, $SD = 0.84$), and the limited emphasis on soft skills development ($M = 4.49$, $SD = 0.82$).

Furthermore, critical thinking ($M = 4.32$, $SD = 0.87$), problem-solving ($M = 4.28$, $SD = 0.91$), creativity ($M = 4.35$, $SD = 0.89$), and digital literacy ($M = 4.21$, $SD = 0.95$) were identified as areas that require significant improvement. Students also reported a lack of leadership development ($M = 4.40$, $SD = 0.85$), interdisciplinary learning ($M = 4.29$, $SD = 0.91$), and ethical decision-making training ($M = 4.27$, $SD = 0.91$), suggesting that existing curricula may not be adequately preparing students for complex, dynamic career environments.

The findings emphasize the need for higher education institutions to incorporate innovative teaching methodologies, interdisciplinary learning, and experiential education to enhance students' readiness for future careers. Faculty professional development in modern teaching strategies ($M = 4.22$, $SD = 0.94$) was also highlighted as an area for improvement. These results call for urgent reforms in university education, particularly in integrating real-world applications, technological advancements, and competency-based learning to bridge the gap between academic knowledge and professional skill requirements.

Discussion

The findings of this study highlight a significant gap between university curricula and the essential 21st-century skills required for success in the modern workforce. The high mean scores across all 30 survey items indicate that students strongly perceive universities as insufficiently preparing them in key areas such as critical thinking ($M = 4.32$, $SD = 0.87$), problem-solving ($M = 4.28$, $SD = 0.91$), creativity ($M = 4.35$, $SD = 0.89$), and digital literacy ($M = 4.21$, $SD = 0.95$). These skills are crucial for adapting to technological advancements, complex problem-solving, and innovative thinking, yet students believe their education primarily focuses on rote learning and traditional assessment methods rather than fostering these competencies. The highest-rated item, "Universities need to reform their curricula to align with 21st-century skill demands" ($M = 4.55$, $SD = 0.81$), further emphasizes students' strong agreement that higher education institutions must modernize their approaches to teaching and learning.

The results also reveal critical deficiencies in experiential learning opportunities and industry-oriented training. Students rated "There is a lack of experiential learning, such as internships and real-world projects" ($M = 4.45$, $SD = 0.84$) and "Universities should integrate industry-based skills training into curricula" ($M = 4.50$, $SD = 0.83$) among the highest concerns. These findings suggest that while universities provide theoretical knowledge, they fail to bridge the gap between academia and real-world application. Additionally, students perceive a lack of leadership development ($M = 4.41$, $SD = 0.85$) and soft skills training ($M = 4.49$, $SD = 0.82$), which are essential for professional growth and employability. The results also indicate faculty professional development as a concern ($M = 4.22$, $SD = 0.94$), highlighting the need for teachers to adopt modern pedagogical techniques that promote interactive, collaborative, and technology-enhanced learning.

These findings align with existing literature on higher education reform, reinforcing the argument that universities must redesign their curricula to better integrate skill-based learning, interdisciplinary approaches, and technology-driven pedagogy. As the results are aligned with the studies that focus the strong agreement among students across all disciplines suggests that these

concerns are not limited to a specific field but are a widespread issue in higher education. Future research could explore the effectiveness of different pedagogical interventions, faculty training programs, and curriculum reforms to address these gaps. Universities must take proactive steps to modernize teaching strategies, enhance student engagement, and prepare graduates for the rapidly changing global job market. Without significant reforms, higher education institutions risk producing graduates who lack the essential competencies needed for success in the 21st century. Recent studies show a widening gap between conventional curricula and the skills needed for the 21st century, including critical thinking, creativity, teamwork, digital literacy, and problem-solving. Many studies show that present teaching practices are mostly content-driven and exam-oriented, stressing rote memory over skill development. Voogt and Roblin (2012) claim that many national curricula either ignore clear integration of 21st-century skills or view them as optional rather than required. The OECD (2018) underlines in the same way that although education systems all around acknowledge the need for these abilities, very few have actually integrated them into curriculum frameworks and classroom practices. Moreover, Trilling and Fadel (2009) advocate a systematic overhaul of curricula to incorporate project-based learning, cross-disciplinary instruction, and technological integration to promote genuine problem-solving skills. Given the needs of a fast changing digital and knowledge-based society, curricular changes that give priority to topics and teaching methods in line with this should be given top priority. Without such changes, schools run the risk of graduating students unprepared for the difficulties and complexity of civic life and modern labor.

Conclusion

This study examined university students' perceptions regarding the absence of 21st-century skills in higher education curricula and pedagogies, using quantitative analysis based on survey responses from 300 undergraduate students at Sindh Madressatul Islam University, Karachi. The results indicate a strong consensus among students that critical competencies such as critical thinking, problem-solving, digital literacy, creativity, and leadership development are not adequately emphasized in their academic programs. With high mean scores across all 30 items, students overwhelmingly agree that universities need to modernize their teaching methodologies, integrate industry-relevant skills, and enhance experiential learning opportunities to better prepare them for the evolving job market.

The findings highlight significant gaps in practical skill development, interdisciplinary learning, and faculty training in modern pedagogies, suggesting that traditional education models do not align with the needs of the 21st-century workforce. Students particularly emphasized the lack of real-world application through internships and project-based learning, which are crucial for bridging the gap between academia and professional demands. Additionally, the limited focus on communication, teamwork, adaptability, and ethical decision-making further underscores the need for curriculum reforms that prioritize holistic student development.

To address these challenges, universities must take proactive measures to redesign curricula, integrate technology-enhanced learning, and incorporate experiential education into their academic structures. Faculty professional development programs should be expanded to equip educators with innovative teaching methodologies that foster collaboration, critical thinking, and problem-solving. Without such reforms, higher education institutions risk producing graduates who lack the essential competencies required for success in a rapidly evolving global economy. This study contributes to the ongoing discourse on higher education reform and provides a foundation for future research exploring effective pedagogical interventions, curriculum

innovations, and institutional policies that can enhance students' readiness for the challenges of the 21st century.

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