



Perceptual Analysis of Diverse Perspectives and Desired Proficiencies in 21st Century Skills among College Going Students

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HIGHLIGHTS

- Consistent familiarity with the term '21st century skills' among students, with no significant differences based on gender, course section, or course year was observed.
- Male students favoured student organizations and clubs for developing 21st century skills, whereas female students emphasize public speaking competitions and multimedia projects as more effective.
- A substantial proportion of college students perceive 21st-century skills as essential for enhancing their future readiness.

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ABSTRACT

In the dynamic post-secondary learning environment, understanding the multifaceted perspectives and sought-after competencies in 21st-century skills among college students is paramount. The ascendancy of 21st-century skills, encompassing learning and innovation skills, information and media literacy, as well as life and career skills, has become pronounced due to the widespread adoption of online education, driven by recent global circumstances. The present study undertakes a perception analysis of 21st-century skills among undergraduates enrolled in traditional courses at Banaras Hindu University (BHU), Varanasi from 2023-2024. Sample size of 325 participants was surveyed through a self-structured tool. The results revealed consistent familiarity with the term "21st-century skills" among students, regardless of gender, course section, or other demographic factors. There was insufficient evidence of an association between familiarity with the term '21st-century skills' and related factors. Students did not vary notably in their assessment of the importance of these skills across course sections. About abilities like critical thinking, creativity, and leadership, there were notable differences in perceptions.

INTRODUCTION

Rapid advancements in technology, society, and science are reshaping economies, businesses, and daily life. To thrive in this dynamic landscape, graduates must develop essential 21st-century skills such as continuous learning, innovation, self-improvement, data literacy, and complex problem-solving (Kocak & Goksu, 2020). The evolving needs of entrepreneurship can be met through a comprehensive approach that combines high-quality small business and life skills training with relevant technical education, financial support, and the cultivation of adaptable and future-ready

competencies (Lekang et al., 2016; Lekang et al., 2017; Nain et al., 2019). 21st century skills encompass the necessary proficiencies for success in modern work, education, and commerce, surpassing traditional literacy, numeracy, and technical abilities (Geisinger, 2016) and the imperative arises for individuals to either collaborate with emerging technologies or undertake responsibilities inherently resistant to automation, underscoring the intrinsic interplay between human agency and technological advancement. A state of well-being and mindfulness requires a shift in thinking patterns, self-regulation, and confidence, along with changes in actions, ultimately leading to

empowerment (Priyanka et al., 2019). Skills pertinent to the 21st-century embody the attributes that prepare individuals, particularly graduates, to function as conscientious citizens and proficient professionals in today's information society (Murat & Cam, 2021). This comprehensive description of skills considers the variety of attitudes, levels of knowledge, and proficiency that graduates need to exhibit to demonstrate specific types of expertise (Chehimi & Alameddine, 2022). As the most dynamic and essential part of society, students play a pivotal role in shaping the future, as their growth and development directly influence the progress and prosperity of a community or nation (Meinam et al., 2023). A fundamental shift in the paradigm of education is required to support students' learning of 21st-century abilities. Furthermore, Nieveen & Plomp (2018) noted that coordinated efforts are necessary for the effective acquisition of these skills at the classroom, school, and systemic levels. Assessing needs, providing hands-on training, experiential learning, and mentorship, along with social media exposure, effectively cultivates adaptive growth among students (Sanjeev et al., 2021 & Ray et al., 2022). The corpus of academic literature divides 21st-century abilities into various competencies that fall into three primary categories; Acquiring knowledge and innovative skills (creativity, critical thinking, problem-solving, communication, collaboration), Media literacy skills and Life and career skills including leadership, productivity and accountability, social skills, self-management, flexibility and adaptability (Häkkinen et al., 2016). The critical importance of the 21st century skill set is widely acknowledged by industry leaders and educational policymakers, despite the cultural variability and diversity in academic descriptions of these skills within scholarly sources (Kotsiou et al., 2022). These skills have been identified as crucial factors for individuals to succeed in their careers and ensure advancement (Ghafar, 2020). This research study aimed to explore the perceptions of college-going students regarding 21st-century skills and investigate their preferences regarding the development of 21st-century skills.

METHODOLOGY

A descriptive research design was used to assess college-going students' perceptions and preferences regarding various 21st century skills. Stratified random sampling was opted for the present study. The survey was administered in the year 2024 to a cohort of 325 undergraduate students enrolled in traditional undergraduate courses across the first, second, and third years at Banaras Hindu University in Varanasi, Uttar Pradesh. Participants were selected from Science, Arts, Social Science, and Commerce disciplines, encompassing students from all academic years and including both male and female students, to ensure a diverse, representative, and inclusive sample that captures a broad range of perspectives and experiences. The voluntary nature of the survey entailed that participants were not incentivized for their engagement, and they were requested to respond to the inquiries based on their overall perceptions of 21st-century skills. A reliable and valid self-structured questionnaire was developed as the primary data collection tool to gather comprehensive insights. Students assessed nine of the twenty perception items using a five-point scale as strongly agree (5), agree (4), neutral (3), disagree (2) and strongly disagree (1). The remaining

perception items were structured as multiple-response checkbox questions to capture a broader range of students' perspectives on various 21st-century skills. The collected data were analyzed using descriptive statistics, including percentage and mean rank, to summarize students' perceptions of 21st-century skills. To assess variations among groups, the Kruskal-Wallis H-test was conducted. In cases where significant differences were identified, Dunn's test with Bonferroni correction was applied as a post hoc analysis to determine specific group-wise distinctions. The results were systematically presented in tables for clarity and structured interpretation.

RESULTS

By analyzing data across diverse student demographics, the research seeks to uncover how students perceive the relevance and need of these skills. The findings of this study are as follows: A diverse group of respondents participated in the study, including students spanning various undergraduate courses, and course years. Out of the 325 students surveyed, the gender distribution leans towards 41 per cent male and 59 per cent female. Additionally, the distribution of undergraduate students by year of study comprised 34 per cent first-year, 58 per cent second-year, and 8 per cent third-year students, offering insights from different academic stages.

Association of "21st-century skills" term familiarity of the students with another factors

The study revealed that familiarity with the term "21st-century skills" did not differ significantly based on gender, course section, course year, and type of school. Male and female students demonstrated similar levels of awareness, indicating that gender did not play a crucial role in shaping familiarity. Likewise, respondents across different academic years showed comparable familiarity. However, a significant variation was observed among students from different course sections, implying that academic discipline influenced awareness levels.

To foster creative thinking, a crucial 21st century skill, university educators should encourage creative inquiry through collaborative learning and open-ended assignments. This approach supports the integration of innovative teaching strategies (Katz-

Table 1. Perceived skills by students as 21st century skills

Skills	Mean rank		H-statistic	p-value
	Male	Female		
Critical thinking	182	146	6.24	<0.001
Creativity	153	168	5.389	<0.001
Collaboration	168	155	13.04	0.156
Communication	169	153	13.94	0.031
Digital literacy	150	165	11.20	0.031
Legal literacy	178	150	6.31	0.50
Flexibility	165	168	12.15	0.456
Leadership	182	147	21.80	<0.001
Initiative and self-direction	156	160	8.76	0.692
Social interaction	157	163	5.08	0.572
Problem solving	159	162	5.04	0.570
Perseverance	160	162	6.22	0.850
Conflict resolution	160	160	5.04	0.993

Buonincontro et al., 2020). The results of the Kruskal-Wallis test as shown in Table 1, gender disparities were evident in the perception of several key 21st-century skills, particularly in areas such as critical thinking, creativity, communication, digital literacy, and leadership. However, no significant differences were observed between male and female students regarding collaboration, and legal literacy, flexibility, initiative, social interaction, problem solving, perseverance, and conflict resolution.

Students' critical thinking skills enhance their ability to employ writing strategies during source-based writing tasks. Furthermore, gender plays a crucial role in shaping students' critical thinking abilities (Zhao et al., 2024). A thorough understanding of the differences in perceived necessity of 21st-century skills across various course sections is essential for the development of effective educational programs. Notable disparities exist among course sections regarding students' perceptions of the importance of several key skills. The Kruskal-Wallis test results indicate a statistically significant difference in familiarity among students from different course sections, suggesting that certain disciplines provide greater exposure to these skills than others, potentially due to variations in curriculum or instructional strategies. Specifically, significant differences were observed for critical thinking ($H=6.24$, $p<0.001$), creativity ($H=5.389$, $p<0.001$), leadership ($H=21.80$, $p<0.001$). Post-hoc Dunn's test with Bonferroni correction identified significant differences in leadership between social science and arts ($p=0.0206$) and arts and science ($p=0.0068$). Similarly, critical thinking showed significant differences between social science and arts ($p=0.0152$) and arts and science ($p=0.0094$). Creativity also varied significantly between social science and arts ($p=0.0185$) and arts and science ($p=0.0071$).

As shown in Table 2, both genders acknowledge the significance of various 21st-century skills; however, their emphasis differs across specific skill domains. Female students highlight the significance of collaboration, communication, and fostering a lifelong learning mindset more than male students. On the other hand, males are more inclined towards preparing for the future and enhancing critical thinking abilities. This gender-based divergence in priorities underscores the necessity for educational programs to cater to these varying perceptions, ensuring that all students develop a balanced set of essential skills for their future careers.

The data suggests that males perceive joining student organizations or clubs as a more effective activity for developing 21st-century skills, while females place greater importance on public speaking competitions and creating multimedia projects. Table 3

Table 2. Respondents' distribution by perceived importance of 21st-century skills

Key Reasons	Female (%) n=192	Male (%) n=133
Preparing individuals for the future	58	92
Enhancing critical thinking abilities	62	75
Improving collaboration skills	79	65
Strengthening communication capabilities	84	65
Fostering innovativeness	67	63
Encouraging a lifelong learning mindset	76	57
Developing leadership competencies	65	65

Table 3. Respondents' perceptions regarding activities that aid in developing 21st century skills

Activities	Female (%) n=192	Male (%) n=133
Joining student organizations or clubs	59	77
Getting involved in volunteering activities	69	70
Participating in internship programs	52	52
Participating in public speaking competitions or debate clubs	68	63
Creating multimedia projects such as videos, podcasts, or blogs	67	59

illustrates gender-based differences in students' preferred activities for developing 21st-century skills. Male students show a stronger inclination toward joining student organizations or clubs compared to female students. Meanwhile, female students place greater emphasis on public speaking competitions and multimedia projects than their male counterparts. Both genders equally recognize the value of internships and volunteering activities. These variations highlight the need for diverse educational opportunities that cater to students' unique skill development preferences. These differing perceptions highlight the need for a diverse range of activities in educational programs to cater to various student preferences, ensuring that all students have opportunities to engage in activities they believe aid in developing their skills.

DISCUSSION

The findings of this study provide valuable insights into the factors influencing students' familiarity with the term "21st-century skills". Notably, gender and course year do not appear to have a significant impact, suggesting that awareness of these skills is relatively consistent across different student demographics. The findings suggest that familiarity with various 21st century skills is widespread and not solely influenced by factors such as gender, course section, faculty, or academic year. A significant variation in the perceived need for various 21st century skills was observed across course sections, suggesting that certain disciplines prioritize these competencies through curriculum design, pedagogical strategies, or the integration of skill-based learning within academic programs. Global recognition underscores the necessity of teaching and evaluating complex competencies known as twenty-first-century skills. A more uniform perception of the need for these skills across genders, implying that general educational strategies for these areas might be equally effective for all students. Differences in learning strategies are evident among higher education students, with variations in the depth of cognitive and metacognitive elaboration despite the use of similar terminology. Adaptability in learning strategies is influenced by multiple factors, particularly assessment activities, shaping students' approach to learning. Students with lower academic performance demonstrate challenges in organization and possess limited knowledge of effective learning strategies (García-Pérez et al., 2021). No significant gender differences were found for collaboration, communication, digital literacy, legal literacy, financial literacy, flexibility, and social interaction across various course sections. In today's competitive job market, strong professional communication skills are essential

for securing employment in both the public and private sectors and students, as future job seekers, favored short and intensive communication skills training programs conducted on college or university campuses (Sikdar and Prakash, 2025). A previous study mentioned digital knowledge, digital attitude, and digital competency as three overarching dimensions, with the latter encompassing several sub-dimensions (Chandra et al., 2024). Critical thinking, a key component of these skills, is essential for problem-solving and decision-making. Low critical thinking has been linked to “risk-taking” and “lost in translation” profiles among undergraduates, indicating potential difficulties in judgment and problem-solving. In contrast, strong critical thinking enhances stress management, improves academic performance, and reduces procrastination (Hen & Goroshit, 2018). For instance, studies have shown that women often emphasize leadership and initiative due to their unique career challenges and societal expectations. This is particularly important in educational contexts where empowering female students through leadership opportunities can have a profound impact on their career trajectories (Smith, 2023). Additionally, the universal importance of critical thinking and creativity is recognized across educational research, though the ways in which these skills are developed and prioritized can differ based on gender (Lim et al., 2020). Addressing these differences through customized educational programs can help in closing the gender gap and ensuring that all students are equally prepared for the demands of the 21st century (Anderson et al., 2022). The analysis suggests a need for gender-sensitive educational strategies that effectively address the diverse needs of students. By recognizing and addressing the significant gender differences in the perceived need for critical thinking, creativity, leadership, and initiative and self-direction, educational programs can be better tailored to prepare all students for the challenges of the 21st century (Lim et al., 2020). This approach not only enhances the overall effectiveness of skill development initiatives but also promotes a more equitable and inclusive educational environment (Anderson et al., 2022).

CONCLUSION

The study has illuminated the perceptions and preferences of higher education students regarding 21st century skills. Addressing the significant disparities in the perceived importance of critical thinking, creativity, leadership, and self-directed learning is essential for crafting educational programs that adequately equip students for 21st century demands. Such an approach not only strengthens the impact of skill development initiatives but also fosters a more inclusive and equitable learning environment. These insights underscore the necessity for educational institutions to adapt curricula and teaching strategies to better align with students' evolving needs and expectations. While the research provides valuable guidance for enhancing educational practices, it is also limited by its sample size and scope, suggesting the need for further studies to explore these dynamics in diverse contexts.

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