

Analyzing 21st Century Skills in Promoting Global Citizenship among Pupils

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ABSTRACT

The transformation of education in the 21st century necessitates a shift from traditional rote-based instruction toward holistic, skills driven, and globally responsive learning frameworks. As the world confronts multifaceted global challenges ranging from climate change and economic disparities to technological disruption and cultural fragmentation—the demand for cultivating global citizenship among learners has become increasingly urgent. This research explores the pivotal role of 21st-century skills in nurturing the principles of global citizenship among postgraduate pupils, with a particular focus on the Pakistani education landscape. The study investigates how modern pedagogical tools, sustainability-centered curricula, hands-on experiences, and alternative assessment methods contribute to the behavioral, academic, and emotional development of students. Using a quantitative approach, the research incorporates a chi-square statistical analysis on data collected from a sample of 100 university students. The core objective is to examine whether significant relationships exist between gender and various educational components such as sustainability values, academic participation, well-being, mentorship, and institutional offerings in sustainability education. The findings from the chi-square tests reveal that in most cases, gender does not have a statistically significant influence on students' perceptions regarding sustainability education and global citizenship. However, certain areas such as confidence in addressing sustainability challenges without practical experience did show significant variation across gender. These insights not only offer a critical understanding of how different demographic groups interact with global education models, but also highlight the importance of inclusive and experiential learning in developing active, responsible, and empathetic global citizens. This study also emphasizes the need for alternative, innovative, and culturally responsive educational strategies that foster interdisciplinary thinking, mental well-being, collaborative problem-solving, and social accountability. It underscores the role of educational institutions in bridging the gap between knowledge acquisition and real-world application by integrating global perspectives into local learning environments. Ultimately, the research contributes to ongoing discourse on the integration of sustainability education and 21st-century skills in shaping a resilient, ethically aware, and socially engaged generation of learners.

Introduction

In the evolving landscape of global education, the 21st century presents an unprecedented demand for a transformative educational approach—one that transcends conventional academic boundaries and cultivates skills necessary for global engagement. As the world becomes increasingly interconnected through technological advancements, economic interdependence, and transnational challenges, the notion of global citizenship has emerged as a key educational priority. This study explores the role of 21st-century skills including critical thinking, collaboration, creativity, communication, digital literacy, cultural awareness, and sustainable thinking in promoting global citizenship among postgraduate students. Education systems across the globe are recognizing the limitations of traditional pedagogical models that primarily emphasize theoretical knowledge and rote memorization. In contrast, the current global era calls for a shift toward outcome-based learning strategies that are learner-centered, skill-oriented, and socially responsive. Within this context, global citizenship education (GCE) has gained prominence as a framework that integrates sustainability, ethics, justice, and inclusivity into teaching practices. GCE aims to empower learners not only to become competent professionals but also to evolve into responsible global citizens capable of tackling global issues such as climate change, inequality, and public health. In Pakistan, however, the integration of 21st-century skills and global citizenship concepts into mainstream education remains a relatively underexplored domain. The lack of specialized programs in sustainability education, insufficient mentorship, rigid curriculum designs, and minimal exposure to interdisciplinary learning often restrict students from realizing their full potential in a globalized context. This research aims to address this gap by analyzing how various educational components—including behavioral well-being, academic participation, values conflict, mentorship, hands-on experience, and institutional support—are perceived across gender lines in promoting global citizenship among pupils.

The research uses a quantitative methodology through chi-square statistical analysis to examine the significance of relationships between gender and specific aspects of sustainability and global citizenship education. This analysis provides evidence-based insights into whether current education practices foster inclusivity and critical engagement among students, regardless of gender differences. Ultimately, the study seeks to recommend policy and pedagogical reforms that align with the goals of Education for Sustainable Development (ESD) and global citizenship in the 21st century.

Literature Review

The concept of global citizenship education (GCE) has evolved significantly over the past few decades as scholars, educators, and policymakers recognize the need for education systems to respond to global challenges with local relevance. As outlined in the Brundtland Report (WCED, 1987), sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This principle lays the foundation for integrating sustainability and global responsibility into educational paradigms.

Scholars such as Bonnett (1999, 2002, 2007) have emphasized that education for sustainable development (ESD) must be rooted in a coherent philosophical

understanding of the human-nature relationship, which informs how learners perceive their role in society and the environment. Andersson (2016) expanded on this by exploring the impact of ESD on pre-service teachers, highlighting the transformative power of sustainability education in shaping values and pedagogical intentions. The role of alternative assessments and interdisciplinary approaches has also been recognized in fostering a broader understanding of global issues, as proposed by Birdsall (2014) and Campbell (1996).

Moreover, the integration of 21st-century skills such as collaboration, critical thinking, and creativity into education is increasingly seen as essential for preparing learners to participate actively in global discourse. Berglund and Gericke (2014, 2015) emphasized the importance of students' sustainability consciousness, indicating that students who engage with sustainability-oriented content demonstrate higher levels of environmental, social, and economic awareness. These skills are not only academic but are deeply connected to emotional intelligence, cultural empathy, and civic engagement.

In the context of developing nations like Pakistan, however, significant barriers remain. Borrg and Gericke (2012) pointed out that teachers face institutional and disciplinary challenges in implementing sustainability education. A study by Blair and Freeman (2004) further identified local constraints such as lack of resources, inadequate mentorship, and weak institutional policies that hinder the effective implementation of GCE.

The literature also reveals a persistent attitude-behavior gap, where students may intellectually understand the importance of sustainability and global responsibility but fail to translate this understanding into action. This is often due to a lack of practical experiences, as Ayres (2001) and Bradely & Reilly (2006) noted, which are essential for building confidence and real-world problem-solving skills among learners.

Furthermore, gender-related disparities in access to mentorship, academic opportunities, and emotional support have been highlighted by researchers like Beck et al. (2010) and Chambers (1997). These disparities can significantly influence how students engage with education that promotes global citizenship, especially in patriarchal societies or contexts with rigid cultural expectations.

In summary, the existing body of literature strongly supports the integration of 21st-century skills and sustainability education to nurture global citizenship. However, the literature also underscores the need for context-specific research—particularly in regions like Pakistan—where educational infrastructure, socio-cultural norms, and policy environments may pose unique challenges. This study builds upon these foundational theories and empirical findings to assess how postgraduate students perceive and engage with global citizenship education within their academic and social environments.

Methodology

This study employs a quantitative research design to explore the relationship between gender and various aspects of sustainability-focused education and global citizenship skills among postgraduate students. The primary aim of this research is to test a set of hypotheses regarding how students of different genders perceive and engage with key educational dimensions such as behavioral well-being, academic

participation, values conflict, mentorship, hands-on experience, and awareness of global challenges. The research seeks to understand whether significant gender-based differences exist in these perceptions and experiences.

Research Design

A descriptive and inferential survey method was used to collect data. The research design was structured to facilitate statistical testing of hypotheses through the Chi-Square (χ^2) test of independence. This method is appropriate for identifying the presence or absence of statistically significant relationships between categorical variables—in this case, gender and responses to various statements about sustainability education and global citizenship.

Sampling Technique and Participants

The study sample consisted of 100 postgraduate students from the University of Karachi. A non-probability convenience sampling method was used due to the accessibility of participants and time constraints. The sample included 54 male and 46 female students, ensuring a relatively balanced gender distribution for comparative analysis.

Data Collection Tool

The research instrument used was a structured questionnaire designed specifically for this study. The questionnaire consisted of statements related to:

- Sustainability education and its impact on well-being
- Academic participation
- Societal and cultural values
- Real-life application of knowledge
- Mentorship and institutional support
- Hands-on skills for citizenship practices
- Confidence in facing global sustainability challenges

Each item required participants to indicate their level of agreement using a three-point Likert scale:

Agree, Neutral, or Disagree.

Statistical Analysis

Data collected were entered and analyzed using IBM SPSS Statistics software (version 22). The Chi-Square test was applied to each hypothesis to determine whether gender had a statistically significant relationship with the given variable.

The level of significance was set at $\alpha = 0.05$. Each hypothesis was assessed based on:

- The calculated Chi-Square value
- The critical/table value at the given degrees of freedom (df)
- The p-value (Asymptotic Significance)

If the calculated value was less than the table value and the p-value was greater than 0.05, the null hypothesis was accepted. Otherwise, it was rejected.

Data Analysis

The data analysis was conducted to test twelve hypotheses that examined the relationship between gender and different educational dimensions influencing global citizenship development. The results of each test are presented below, along with the interpretation based on Chi-Square statistics.

Hypothesis 1: Gender and Behavioral Pattern of Well-Being

- Chi-Square Value: 3.598

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- Table Value: 3.667

- P-Value: 0.165

Interpretation: The calculated value is less than the table value and $p > 0.05$. Null hypothesis accepted—no significant relationship between gender and behavioral pattern of well-being.

Hypothesis 2: Gender and Academic Participation

- Chi-Square Value: 1.239

- Table Value: 1.618

- P-Value: 0.445

Interpretation: As the p-value is greater than 0.05, null hypothesis accepted—no significant relationship between gender and academic participation.

Hypothesis 3: Gender and Societal Values Conflict

- Chi-Square Value: 3.659

- Table Value: 4.055

- P-Value: 0.132

Interpretation: With $p > 0.05$ and the calculated value less than the critical value, null hypothesis accepted—no significant gender-based difference regarding value conflicts.

Hypothesis 4: Gender and Struggle in Real-Life Scenarios

- Chi-Square Value: 1.230

- Table Value: 1.609

- P-Value: 0.447

Interpretation: Again, $p > 0.05$ and calculated value is below table value, so null hypothesis accepted—no significant relationship exists.

Hypothesis 5: Gender and Hands-On Citizenship Skills

- Chi-Square Value: 0.535

- Table Value: 0.539

- P-Value: 0.764

Interpretation: The difference is statistically insignificant. Null hypothesis accepted.

Hypothesis 6: Gender and Skills for Sustainability Challenges

- Chi-Square Value: 7.719

- Table Value: 8.176

- P-Value: 0.017

Interpretation: $P < 0.05$, but the calculated value is less than the table value—inconsistency in conclusion noted. However, based on p-value alone, null hypothesis would be rejected indicating a significant relationship.

Hypothesis 7–12: Summary

Hypothesis	Chi-Square Value	Table Value	P-Value	Conclusion
H7: Cultural Context	4.126	4.218	0.089	Null accepted
H8: Innovation in Pedagogy	2.678	3.841	0.262	Null accepted

H9: Interdisciplinary Approaches	3.884	4.321	0.142	Null accepted
H10: Mentorship in Education	4.506	4.734	0.105	Null accepted
H11: Specialized Programs	4.147	4.910	0.126	Null accepted
H12: Comprehension of Global Challenges	3.425	4.183	0.180	Null accepted

Summary: Of the 12 hypotheses tested, 11 hypotheses showed no significant relationship with gender, while only one (H6) showed statistical significance based on its p-value, suggesting that gender may influence how students perceive their ability to face global sustainability challenges without practical experience.

Findings

The analysis of the data revealed several important findings concerning the role of gender in shaping postgraduate students' engagement with sustainability education and global citizenship skills:

1. Behavioral Well-Being: The majority of students (78%) agreed that sustainable education positively influences behavioral patterns related to well-being, while gender was found to have no significant effect on this perception.
2. Academic Participation: 68% of respondents agreed that sustainability education encourages active academic involvement. Again, no gender-based differences were statistically evident.
3. Conflict with Societal Values: 62% of students agreed or strongly agreed that unskilled students face conflict between sustainability values and societal expectations. However, gender was not a significant variable in this context.
4. Real-Life Struggles for Knowledge: Most students (62%) believed that lack of integration in education causes struggles in applying knowledge practically. No significant relationship between gender and this belief was found.
5. Hands-on Experience and Citizenship Skills: 56% supported the idea that practical skills enhance citizenship practices. Gender differences were not statistically significant here either.
6. Sustainability Challenge Readiness: 64% agreed students lack confidence to address global challenges without practical experience. This was the only hypothesis where gender showed statistical significance ($p = 0.017$), suggesting that male and female students may differ in perceived preparedness.
7. Cultural and Social Context: 66% of participants acknowledged the importance of considering social and cultural contexts in sustainability education. Gender differences were not significant.
8. Innovative Pedagogy: 58% agreed that innovative teaching improves motivation and well-being. Again, gender was not a differentiating factor.
9. Need for Interdisciplinary Approaches: While a substantial portion supported interdisciplinary methods, gender did not significantly affect this opinion.
10. Mentorship in Sustainability Education: Responses showed support for improved mentorship quality, yet no significant gender differences were observed.

11.Availability of Specialized Programs: Nearly half of the students expressed concern over the lack of specialized sustainability education programs. Gender differences were not statistically significant.

12.Understanding of Global Citizenship Complexity: A significant portion agreed that traditional education hinders understanding of global challenges. However, gender did not play a major role here either.

Discussion

This study offers valuable insights into the gender-based perceptions of postgraduate students regarding sustainability education and the development of global citizenship skills. One of the most encouraging findings is that students across genders generally perceive sustainability education as valuable, particularly in promoting well-being, academic engagement, and preparedness for global challenges. The only area where gender played a statistically significant role was in students' confidence and perceived ability to address global sustainability challenges without practical experience. This could reflect differences in learning environments, mentorship access, or cultural expectations associated with gender roles in educational contexts. The findings suggest that male and female students may benefit from tailored approaches to experiential learning, confidence-building, and real-world application of theoretical concepts.

The findings reinforce the value of alternative assessment strategies, which not only enhance academic performance but also allow students to recognize their inner strengths, creativity, and well-being. The use of SPSS and chi-square testing provided robust validation for the hypotheses, most of which were not supported by significant gender variance.

Overall, this discussion underscores the importance of inclusive and equity-driven educational frameworks, where students from all genders are provided equal opportunities to thrive in sustainability-focused learning environments.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1.Promote Experiential Learning: Institutions should integrate more project-based and hands-on learning modules to help students, especially those who lack confidence, to engage with real-world sustainability issues.

2.Gender-Sensitive Curriculum Design: While most responses were not influenced by gender, the one area that showed significance suggests that gender-responsive teaching strategies may enhance outcomes, particularly in preparing students for global challenges.

3.Strengthen Mentorship: Universities should enhance mentorship opportunities, ensuring equal access for male and female students, particularly in the context of sustainability and global citizenship training.

4.Develop Specialized Sustainability Programs: There is a clear need to introduce more specialized and interdisciplinary courses that blend environmental, social, and economic perspectives.

5.Encourage Non-Formal Learning: Exposure to non-traditional education such as workshops, travel-based learning, and global exchange programs can enrich students' understanding of global citizenship.

6.Improve Emotional Well-Being Resources: Since many students expressed concerns about stress, anxiety, and negative emotions, it is recommended that universities strengthen their mental health and counseling services.

7.Utilize Technology and Innovation: Virtual reality, gamification, and AI can be powerful tools in enhancing student engagement, motivation, and understanding of sustainability challenges.

8.Emphasize the 4Cs: Creativity, Collaboration, Critical Thinking, and Communication should be systematically embedded into all learning modules to foster holistic development.

9.Bridge the Academic-Industry Gap: Educational institutions should foster partnerships with industries, NGOs, and international bodies to provide students with real-world exposure.

Conclusion

This study concludes that while postgraduate students in Karachi perceive sustainability education as vital for personal growth and global citizenship, gender generally does not play a statistically significant role in shaping their responses with one key exception. The data shows that students' confidence in facing sustainability challenges without practical experience differs by gender, calling for nuanced strategies in curriculum development.

The use of alternative assessments, including real-world application, self-reflection, and non-traditional pedagogies, is shown to be effective in supporting academic success and personal development. These assessments help students identify their hidden strengths, manage anxiety, and engage more deeply with course content.

It is recommended that educational institutions move beyond traditional, rote-based learning and instead embrace creative, inclusive, and sustainable approaches. By doing so, they can better prepare students to face the complex and interconnected global issues of the 21st century, regardless of gender.

Ultimately, fostering global citizenship education with equity, empathy, and engagement at its core is the key to building a more sustainable, aware, and collaborative future.

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