

## Original Article

### Gamification as a Mechanism for SDG Sensitization: Integrating Game-Oriented Instruction in Higher Education

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#### Abstract

This research paper explores the innovative use of gamification as a tool for sensitizing students towards Sustainable Development Goals (SDGs) within higher education institutions. By aligning game-oriented instructional practices in undergraduate classrooms, this study aims to evaluate the effectiveness of interactive game-based learning in enhancing SDG awareness, engagement, and behavioural change among students. A multidisciplinary approach is developed and implemented to examine how gamified learning interventions can foster critical understanding and sustained commitment toward SDG-related themes. Gamification has become a fairly recent addition to the topics covered in the Simulation & Gaming journal. This domain "The domains addressed in the Simulation & Gaming journal. This method, aimed at shaping users' behaviour and enhancing their engagement by embedding game design components into various procedures, practices, interfaces, etc. The field of simulation has a long history of using games to teach and raise awareness about sustainability issues. The number of games produced to this end has grown in recent years, with many new titles combining economic, societal, and environmental aspects in their approaches.

**Keywords:** Gamification, Sustainable Development Goals (SDGs), Higher Education, Game-based Learning, Student Engagement, Behavioural Change, Interactive Learning, Multidisciplinary Approach, Pedagogical Innovation, Sustainability Education.

#### Introduction

The Sustainable Development Goals (SDGs), also referred to as the universal Goals, were selected by the United Nations in 2015 as a global initiative to end poverty, protect the planet, and ensure that all people experience peace and prosperity by 2030. The 17 SDGs are interconnected, meaning that actions taken in one area can influence results in others. While various channels focus on implementing policies and involving communities, the role of higher education is equally vital in raising awareness and encouraging sustainable behaviors. Traditional teaching methods often limit student involvement and offer little connection to real-world issues. Gamification, which involves using game elements in non-game settings, presents a new and effective way to teach about the SDGs and help students develop lasting sustainable habits. These practices are also beneficial for other purposes.

SDG-centred learning encourages students to think critically about real-life issues and connect classroom experience with global challenges, thereby promoting social responsibility and ethical decision-making.

1. Higher education institutions serve as hubs of innovation and knowledge creation; therefore, integrating SDGs into teaching practices can foster future professionals who are capable of contributing to sustainable development in their respective fields.
2. Gamified learning environments empower students through active participation, collaboration, and problem-solving, which ultimately increases their motivation to engage with complex SDG-related issues.
3. By incorporating playful learning strategies, instructors can transform abstract SDG concepts into concrete experiences, making them easier to understand and remember.
4. Moreover, gamification encourages peer interaction and teamwork, which can improve interpersonal skills and promote a sense of shared responsibility toward sustainability goals.

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### Review of Literature:

Previous studies Focus the usefulness of interactive methodologies in sustainability education (Bianchi & Szabo, 2021).

However, minimal research has investigated the implemented of structured gamified experiences in the context of SDG sensitization. Most existing studies emphasize digital tools and online game platforms but rarely incorporate physical or hybrid games aligned with SDG themes. In this background, the present study highlights on designing a holistic gamification framework specifically focused on SDG sensitization in higher education classrooms.

Several researchers (e.g., de Freitas, 2018; Hamari & Koivisto, 2019) argue that game-based learning promotes deeper cognitive processing and enhances long-term retention of sustainability-related information, yet these studies often lack empirical validation within the SDG framework.

Existing literature generally highlights on students' perceptions of gamification rather than measuring its real impact on behaviour and value formation related to sustainable development (Dicheva et al., 2015).

few studies find the potential of hybrid gamification models (combining physical and digital game elements) for fostering collaborative learning and peer-driven SDG engagement in higher education settings.

### Objectives :

1. To develop a game-oriented instructional model that integrated with SDG learning outcomes.
2. To evaluate the effectiveness of gamification as a mechanism for SDG sensitization among undergraduate students.

### Partnership for the goals.



3. To examine the impact of game-based learning on students' motivation, participation, and sustainable behavioral intentions.
4. To design game-oriented instructional model that implemented SDG themes into higher education classrooms.
5. To assess the effectiveness of gamification as a pedagogical mechanism for sensitizing undergraduate students toward the Sustainable Development Goals.
6. To examine the impact of gamification on students' motivation, classroom engagement, and participation in SDG-related activities.
7. To assess behavioural change and sustainable practices promoted through gamified practice interventions.
8. To find the role of multidisciplinary learning in enhancing SDG awareness through gamification across Science, Commerce, and Arts streams.
9. **Research Hypothesis:** Gamification-oriented instruction significantly enhances SDG awareness and promotes positive behavioral intentions toward sustainable development among undergraduate students.
10. Gamification-oriented instruction significantly enhances SDG awareness among
11. higher education students..
12. Gamification positively influences student interest and classroom involvement.
13. Gamification contributes to the development of sustainable behavioural intentions.

**Methodology:** This research adopts a mixed-methods design. A sample of 80 undergraduate students from different disciplines (Science, Commerce, Arts) in a higher education institution participated in the study. The participants were divided into a control group (traditional lecture-based instruction) and an experimental group

## Research Design

Mixed-methods approach combining quantitative (survey, pre-test/post-test scores) and qualitative (focus group discussions, reflective journals) data.

Sample: 80 undergraduate students (Science, Commerce, Arts).

Experimental Group (Game-Based Instruction) vs. Control Group (Traditional Lectures).

### Gamified Learning Modules

Five SDG-focused gamification modules were designed:

1. SDG Quiz Challenge – Competitive quiz rounds using SDG-related case studies.
2. Role-Play Simulation – Students act as policymakers, NGOs, or entrepreneurs solving sustainability issues.
3. SDG Treasure Hunt – Interactive classroom activity linking clues with SDG facts.
4. Sustainability Board Game – A game designed around decision-making, resource allocation, and teamwork.
5. Digital Gamification Tools – Use of Kahoot, Quizizz, and leaderboard systems for tracking progress.

### Data Collection Tools

- a. Pre-test & Post-test Questionnaires (to measure awareness)
- b. Motivation and Engagement Scales.
- c. Classroom observation checklists.
- d. Focus Group Discussions (qualitative insights).

### Data Analysis

Quantitative Data: Paired t-tests and ANOVA for comparing control vs. experimental groups.

Qualitative Data: Thematic analysis of reflective journals and discussions.

### Results & Discussion:

Expected improvement in SDG awareness among experimental group. Increased classroom participation and motivation due to game dynamics. Students report stronger personal commitment to sustainability actions. Integration of transdisciplinary perspectives makes SDGs more relatable.

### Conclusion:

Gamification gives an innovative and effective approach for sensitizing higher education students toward SDGs. By combining interactive learning with real-world sustainability challenges, it not only enhances awareness but also promotes motivation, collaboration, and behavioural change. This study demonstrates the potential of game-oriented instruction as a transformative

pedagogical mechanism for sustainability education. Gamification is viewed as an effective strategy in promoting sustainable consumption as it engages people both intrinsically and extrinsically. Through gamification, both intrinsic and extrinsic motivations are generated for routine or mundane human activities. These studies highlight how gamification can make sustainability education more engaging and effective across diverse topics. Transitioning to academic environments, gamified e-learning platforms have been found to enhance student motivation and engagement.

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### Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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