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Exploring Learning Outcomes in Sustainable Management through the Triple Bottom Line and LEGO SERIOUS PLAY

Patrick Kiernan
Zoe Zhu
Yuri Fukaya
Masao Ishihara

Every breath of air we take, every mouthful of food that we take, comes from the natural world. And if we damage the natural world, we damage ourselves.
David Attenborough (Hamilton, 2025)

1. Introduction

This paper reports on an international project aimed at improving sustainability management education at Meiji University in Japan. In particular, it aimed to both develop an understanding of and promote the ability to manage *the Triple Bottom Line*. The Triple Bottom Line (TBL—also referred to as the "three Ps" meaning *people, planet, profit*) is a term attributed to Elkington (1997). It is intended to balance the traditional preoccupation of business with generating profits for its shareholders with an ethical responsibility to other stakeholders (*people*—such as employees, customers, and others impacted by an organization's activities); and the environment, particularly the natural environment in which it exists and depends on for its resources (*planet*).

The project described here was part of a broader collaboration among business students and faculty at Meiji University (Japan), Seattle Pacific University (U.S.), and Lancaster

University (U.K.) to raise awareness of sustainability issues and effective practices and foster the skills needed to address sustainability issues in the future. The collaboration was a two-year project made possible through a research grant from Mitsubishi Memorial Foundation for Educational Excellence (MMFE, 2025). This paper focuses on the part of the project which aimed at both raising awareness of sustainability management issues and fostering the creative skills needed to deal with them during classes conducted at Meiji University. Management students at university, such as those at Meiji University are an important target for such education, as they are preparing for careers that will likely be in influential positions of leadership. Moreover, research into the psychological development of identity indicates that the ages of 18 to 22, the years of undergraduate university, are crucial for identity development (Draaisma, 2006).

One of the key methods used during this project for student collaboration and communication is called LEGO Serious Play (LSP). As will be explained more fully below and in Section 2 of this paper, LSP involves the use of sets of plastic building blocks as a tool for abstract thinking, problem solving, and generating and sharing ideas. All sessions were overseen by Mr. Ishihara, a qualified and experienced LSP facilitator. LSP seemed a particularly appropriate tool for this project as the physical construction and sharing of the plastic models by all participants promotes full and equal participation in brainstorming and discussion. Moreover, issues in sustainability management are notoriously complex and conflicting and require creativity and innovation to find effective solutions.

1.1 Background

While human beings have evolved and thrived in the rich and comfortable environment of planet Earth for thousands of years, we have reached a point where the rate that planetary resources are being used has outstripped the Earth's ability to regenerate and recover (GFN, 2025; Tian et al. 2024). This has become increasingly apparent with regard to both the rate of diminishing resources, and the waste and pollution that have resulted (IPCC, 2025). In other words, we live in a world that is unsustainable on its current trajectory. A key reason for this material unsustainability is that the development of the global economy has focused on productivity, enriching people's lives materially but also making consumption of the world's resources increasingly efficient—over efficient. The issue of unsustainability is not limited to the destruction of the natural world but also embraces the distribution of resources and

relationships within the human world. Hence, inequality, discrimination, and poverty may be considered as both causes that have exasperated the drain on the world's resources (Tian et al., 2024) and human concerns that may potentially become more acute as resources become scarcer (Dang, Hallegatte, & Trinh, 2024). The interconnected nature of social and environmental sustainability is reflected in the 17 sustainable development goals (SDGs) developed by the United Nations (2025). Beginning in 2015, SDGs provide a concrete agenda for addressing sustainability issues by the year 2030 with progress reports issued annually. Accordingly, there is a need for a fundamental shift in the way that the world is managed at all levels to evolve towards a sustainable use of planetary resources and human relationships.

The complexity of the challenge faced by those involved in global and local management is underlined by the fact that while many industries, organizations, and governments face the threat of the resources on which they depend dwindling or even disappearing, protective measures may threaten their activities and/or existence. Business profitability has long been seen as the "bottom line." Ultimately this has traditionally meant not only that corporate activities must generate financial profit but that the more profit generated, the more successful the organization, irrespective of social purpose. Similarly, personal wealth and consumption have become the hallmark of social success. Globalization has not only increased the power and spread of organizations but exasperated the gap between the rich and poor. Some have argued that this is fundamentally misguided and proposed that a dramatic shift is needed. For example, MacKinnon (2021) explores how "ending consumerism" could contribute to "saving the environment and ourselves." Based on research into communities who have adopted a lifestyle of "voluntary simplicity," dramatically reducing or eliminating excessive consumption, MacKinnon (ibid) argues that not only do such communities serve as a model for how to live with a minimal environmental footprint but that they enjoy a level of spiritual fulfillment absent from consumer-based societies. Nevertheless, even he admits that his proposed shift would be disastrous for the global economy.

Meanwhile, in response to a growing public awareness and concern for the issues highlighted by the SDGs, corporations have increasingly focused on highlighting their organization's credibility in terms of corporate social responsibility (CSR). While there are businesses that focus on genuine ethical policies and improving sustainability and recognize their responsibility to a range of stakeholders beyond their shareholders, there are also others who pay lip service to human and environmental concerns but fail to match this with action.

The worst offenders are sometimes highlighted by protest groups and accused of "greenwashing." However, for most organizations CSR and sustainability are an integral part of public relations. At a minimum, tomorrow's managers need to be aware of this. More importantly they need to be capable of implementing meaningful measures because, as Dyllick and Muff (2015) pointed out, there is a "big disconnect" between the growth and implementation of sustainability practices and the ongoing deterioration of the planet.

To avoid this disconnect, and with a view to developing a more balanced and realistic approach to sustainability education, this project focused on the concept of the Triple Bottom Line, which seeks to balance corporate responsibility among *people, planet,* and *profit* (Elkington, 1997). It sought to raise awareness of and explore, the notion that corporations have a responsibility not only to their shareholders, who expect the organization to generate profit, but to a range of stakeholders including customers and employees, but also those impacted by the companies activities, which ultimately requires giving consideration to the local and global environment—a recognition which has become increasing urgent (Sekol, 2024).

1.2 Overview of the International Project

The project described in this paper was carried out among staff and students at three institutions: Meiji University, Seattle Pacific University (SPU), and Lancaster University (LU). The larger project, which was carried out over two years, included online and face to face classes introducing SDGs, the Triple Bottom Line, and exemplary sustainability initiatives, and a public panel discussion forum on sustainability education. Two lecturers each, from both the U.S. and U.K. universities, who specialized in sustainability issues in their respective countries visited Meiji University during the project including two visits by two of the professors, so six visits in total. During each visit, large classes were held for the Meiji University first-year Global Resources English Applied Track (GREAT) program in the School of Business Administration (around seventy students per session), and additional smaller sessions for third- and fourth-year undergraduates including online LSP sessions with SPU and LU.

This paper focuses specifically on sessions during the second year of the project (April 2024~January 2025) which used the LSP methodology to promote creative thinking and discussion of sustainability management. There were two parts to this project: smaller online inter-university LSP sessions, a larger group of first year undergraduate students. As

explained in the later sections, the project was also analyzed both quantitatively and qualitatively.

The inter university sessions were conducted via a Zoom video link, facilitated by the LSP coordinator based in Japan but assisted by teaching staff in each institution.

The first-year undergraduate students worked in groups of four to six spread over adjacent rooms but connected via a Zoom video link. During the first part of the session an introductory talk on sustainability management and the Triple Bottom Line was followed by the LSP activities. The LSP activities were overseen by the LSP coordinator but also assisted by teaching staff and some students from the inter-university session. All Zoom sessions were recorded for analysis.

The specific rationale for LSP is summarized in Section 2.1, however, LSP was introduced as an effective example of a task-based methodology, intended to complement the lectures, which themselves included discussion and reflection activities to raise engagement. Task-based learning is an educational approach aligned with the principles of *active learning* (Peterson et al. 2016) which recognizes that a deeper learning is enabled through communicative and/or physical engagement than through the passive cerebral absorption of verbal information. It is an approach which has become particularly important in communicative approaches to classroom based foreign language teaching where tasks serve the purpose of providing a goal-based context for communicative language use (Ellis, 2003; Willis & Willis, 2007). Nevertheless, it has been recognized that just as language learners benefit from tasks providing a context for using language with a focus on communication, creative and critical thinking can be enhanced through communicative tasks (Csikszentmihalyi & Wolfe, 2015; Hsia, Lin, & Hwang, 2021; Li & Yu, 2025). In addition, LSP enables an opportunity to explore abstract concepts through the physical plastic LEGO blocks. These constructions can serve as a focus for individuals to share their ideas within the group ensuring full and equal participation. Individual models may also be combined into collaborative ones or made as shared constructs from the outset.

This paper is organized as follows: the next section outlines the theoretical background of LSP and the approach taken here; Section 3 describes the quantitative data evaluating the student development as a result of participating in the project; and Section 4 focuses a qualitative analysis of the international collaboration using LSP. The conclusion summarizes the findings and implications of the study.

2. Theoretical Background of LSP

LEGO Serious Play (LSP) is a facilitated methodology that grew out of conceptual work in the mid-1990s by Johan Roos and Bart Victor at IMD (International Institute for Management Development). IMD is a Swiss based independent academic institute that offers MBAs and executive education and claims to "support the transition to a new model that balances prosperity and growth with ecological inclusion." (imd.org, 2025). LSP was further developed from 1999 by Robert Rasmussen at the LEGO Group, later joined by Per Kristiansen. Formally launched in 2002, the method was expanded between 2005 and 2007 into a modular system with a four-step Core Process and seven Application Techniques. Far from being a simple "play activity," LSP is grounded in theories of learning, psychology, and organizational behavior, and its effectiveness has been reinforced over two decades of research and practice (Kristiansen & Rasmussen, 2014).

A central foundation is Csikszentmihalyi's theory of flow (1990), which describes deep immersion when challenge and skill are balanced. Building and storytelling in LSP foster such states, allowing participants to suspend distractions, experience creativity, and engage in collective focus.

LSP also draws on Piaget's constructivism (1970) and Papert's constructionism (1980). Constructivism holds that learners actively build knowledge through interaction, while constructionism emphasizes making tangible artifacts as the most powerful way to learn. LSP exemplifies this by enabling participants to "think with their hands," externalizing ideas into models that stimulate reflection and dialogue.

Metaphor and storytelling further enhance this process. Models serve as metaphors for participants' thoughts, and narratives make complex ideas vivid and memorable, bridging language and cultural barriers (Gauntlett, 2007). In group settings, this creates shared meaning and empathy.

From a neuroscience perspective, the SCARF model (Rock, 2008) highlights dimensions of engagement—Status, Certainty, Autonomy, Relatedness, and Fairness—that align with LSP's facilitation principles. Clear steps, equal turns, and predictable processes foster psychological safety (Edmondson, 1999), reducing cognitive load and encouraging sharing of tacit knowledge.

Rock (2008) further demonstrated that the five domains of human social experience—

Status, Certainty, Autonomy, Relatedness, and Fairness—elicit reward or threat responses in the brain. These domains activate the same neural circuitry involved in primary survival needs, suggesting that social interactions are processed with the same urgency as physical safety. Subsequent work (Rock, 2009) emphasized that leaders and educators who design interactions to maximize reward states—by ensuring fairness, granting autonomy, or clarifying expectations—can significantly enhance engagement, learning, and collaboration. Integrating these insights into LSP provides a neuroscientific rationale for why the method fosters psychological safety and sustained participation.

Recent research supports LSP's value in education. Benesova (2023) documented its role in enhancing creativity and collaboration in management education, while Meletiadou (2023) showed its impact on multilingual students' communication and intercultural competence. Such studies underscore LSP's adaptability across leadership, STEM, and higher education.

In summary, LSP stands on a solid theoretical foundation, combining flow, constructivist learning, metaphorical storytelling, and psychological safety. Its grounding explains why it reliably promotes creativity, engagement, and collaborative problem solving in diverse educational settings.

2.1 Online Adaptation of LSP

Originally designed for face-to-face workshops, LSP had to be carefully adapted for online settings. The challenge was to translate embodied, hands-on learning into digital contexts without losing its impact.

The project consisted of two joint LSP classes held on November 15 and November 22, 2024, with 12 students from Meiji University and 9 from Seattle Pacific University (SPU). Students at each site were divided into small groups of 4-6 members and worked around tables with LEGO materials. One student per group logged into Zoom on behalf of their table, enabling mixed breakout rooms where Meiji and SPU students collaborated in real time. This arrangement created hybrid teams across sites while preserving small-group dynamics at each location.

Key adjustments included camera positioning to display models clearly, and the use of breakout rooms to sustain the principle that "everyone builds, everyone shares." At Meiji University, Zoom was used with structured breakout groups. Assistant students clarified

instructions, repeated prompts, monitored time, and adjusted camera positions so that the models could be viewed clearly across sites. This distributed facilitation helped maintain engagement and consistency.

Visual storytelling also required adaptation. Instead of pointing to physical models, students used camera focus, hand gestures, and descriptive language. Some groups combined LEGO models with digital whiteboards or slides, creating multimodal expressions. These digital artifacts—screenshots, shared boards, recordings—could be revisited, extending reflection beyond the session.

Importantly, these sessions followed the official LSP methodology without shortcuts. Core techniques and principles, as outlined in the facilitator manual and Kristiansen & Rasmussen (2014), were preserved. Fidelity was critical to avoid diluting experiential learning.

Despite the challenges, online LSP retained its defining features: hands-on building, metaphor-driven storytelling, and equal participation. When adapted carefully, it not only mirrored many benefits of face-to-face workshops but also expanded access, enabling intercultural collaboration at a scale not possible in traditional classrooms. This points toward a hybrid future that combines the strengths of physical co-presence with the accessibility of virtual platforms.

2.2 Session Design and Activities

LSP sessions begin with Skills Building to help all participants engage on equal footing. Rather than aiming for correct answers or competition, these exercises emphasize freedom of interpretation and reduce anxiety. In the classes, students were asked to "build a tower in five minutes in any way that makes sense to you" or "make a model of a good learning experience." Such personalized tasks reminded participants that there is no single correct way to build, creating a safe environment for personal expression and preparing them for more metaphorical challenges.

After this foundation, the sessions moved through a structured sequence. In the first international joint class connecting Japanese and U.S. universities online, students created individual models to represent values behind corporate sustainability actions and then shared their stories with peers. This step made tacit reasoning visible and encouraged intercultural dialogue. In the second class, the process advanced to group integration: individual models were placed together on a shared baseplate to form a landscape using Application Technique

3 (AT3). AT3 is a core LSP method in which individual models are brought together into a shared representation of the whole system. In this case, students wove together the meanings of their models into a collective narrative without altering each other's work.

The sessions concluded with group presentations in which students pointed to their models while explaining the shared story. Photographs, recordings, and digital boards captured these collective artifacts, allowing reflection beyond the session.

In both online and hybrid formats, specific design elements maintained equity and presence: consistent camera positioning, clear timekeeping, and structured breakout protocols. This combination of Skills Building, individual construction, group integration, and collective presentation ensured that the sessions provided psychological safety (Edmondson, 1999), supported flow states (Csikszentmihalyi, 1990), and enabled authentic exploration of complex sustainability challenges.

2.3 Facilitation Techniques and Co-Creation Strategy

The facilitation design of the joint classes drew on the established Application Techniques (AT1–AT6) of the LSP method, which are systematically described by Kristiansen and Rasmussen (2014). Each Application Technique provides a structured way to move from individual reflection to collective sense-making. For these classes, the design deliberately selected AT1 (Individual Model Building and Sharing) and AT3 (Landscape) to achieve both engagement and co-creation across cultural boundaries.

AT1 consists of exercises and facilitation aligned with the LSP core process—*pose a question, build, share, and reflect.* Its purpose is not merely to introduce the method but to leverage the psychologically safe environment already created through Skills Building. Within this safe space, students externalize ideas that are often difficult to verbalize by constructing three-dimensional models. They then use these models as narrative anchors to tell stories, enabling them to "think about their thinking" while making their perspectives visible to others. In this way, AT1 serves to unlock and liberate individual ideas, allowing each participant to share their voice in an inclusive manner.

AT3 extends this process from individual expression to collective integration. In AT3, participants place their individual models together to create a shared landscape that reveals relationships, tensions, and commonalities. Importantly, each model remains intact—no one's contribution is erased—while the group negotiates meaning to weave a super-story that

integrates diverse perspectives. In the second class, AT3 allowed students from different cultural contexts to combine their models into a collective representation of organizational values, with physical connections symbolizing collaboration.

By combining AT1 and AT3, facilitation ensured both inclusivity and co-creation. AT1 enabled each student to free and articulate their own ideas through model-building and storytelling, while AT3 provided a structured strategy to integrate these ideas into a cohesive group narrative. Together, these choices illustrate how facilitation design, grounded in the LSP method and informed by Kristiansen and Rasmussen's (2014) framework, cultivates reflection-in-action (Statler et al. 2011) and structured play as a mode of adult learning (James, 2013).

2.4 Reflections on Implementation

The integration of LSP into international joint classes generated outcomes at multiple levels while also raising considerations for future practice.

At the individual level, students gained self-efficacy in expressing perspectives, even in intercultural teams. At the group level, the 100-100 engagement principle fostered inclusive participation, teamwork, and psychological safety. At the institutional level, LSP offered a practical means to promote global competencies and bridge theory with practice, consistent with experiential learning models (Kolb, 2015; Papert, 1993).

Several limitations should be noted. This study involved a limited set of classes and participants, constraining generalizability. Outcomes were assessed primarily through qualitative reflections, limiting comparability. Moreover, facilitator expertise was essential; without fidelity to the method, LSP risks being reduced to a superficial activity. These challenges may affect scalability.

Future research should pursue mixed-method designs with larger and more diverse populations, integrating both qualitative and quantitative measures. Longitudinal studies are also needed to examine whether the communication and teamwork skills cultivated through LSP persist beyond the classroom and continue to influence students' future learning and collaborative experiences.

Finally, online and hybrid education present opportunities to expand accessibility. Refining facilitation techniques, leveraging AI-enabled tools for reflection and feedback, and designing inclusive digital environments may further enhance intercultural understanding.

In summary, LSP shows strong potential to enhance individual, group, and institutional learning outcomes in international education. Realizing this promise will require methodological rigor, facilitator preparation, and thoughtful adaptation for sustainable integration into higher education.

Looking ahead, future studies could explore how LSP interacts with neurocognitive models such as SCARF, which illuminate the mechanisms of engagement and psychological safety in intercultural teams. Longitudinal and mixed-method designs would help assess whether skills developed in LSP sessions—such as self-efficacy, teamwork, and intercultural communication—persist beyond the classroom and shape students' future academic and collaborative experiences.

For educational practice, integrating LSP with neuroscience-informed facilitation could support universities in designing learning environments that are both cognitively challenging and socially rewarding. Such environments would better prepare students to thrive in complex global settings.

3. Quantitative Study

3.1 Objective

The quantitative study aimed to explore how LEGO Serious Play (LSP) can enhance the utilization of team members' ideas and opinions and consider its impact on problem-solving. We evaluated student learning outcomes through measurable indicators (i.e., self-efficacy, and teamwork) in an anonymous online self-assessment survey at the beginning and end of the project using LSP through online collaborative learning class with international students. Self-efficacy and teamwork were chosen as key variables to examine how specific characteristics of Japanese students may change through international collaborative learning. Self-efficacy was selected because it is often identified as a challenge for Japanese students when compared to international peers, whereas teamwork was included as it is commonly recognized as one of their strengths.

3.2 Target

To evaluate students' learning outcomes throughout the projects, identical surveys were conducted at two time points (pre- and post-implementation of this project). The survey period

was approximately one month, from late October to early December 2024. As described in the previous section, some sessions were connected via Zoom with students at Seattle Pacific University in the United States. Classes were conducted in a hybrid format that combined on-demand lectures with interactive on-site lectures. In this class, students identified issues and developed solution plans for SDGs challenges, and finally gave presentations. Four international collaborative teams were formed, each consisting of approximately 3-4 students from each university. They were encouraged to use specialized LSP tools to facilitate the exchange of ideas and opinions. During the one-month project period, each team engaged in activities, utilizing e-mail, Zoom, and social media, successfully conducting presentations online.

3.3 Instruments

The measurement scales are self-efficacy, and team effectiveness including attributes. Attributes are gender (Female, Male, and Prefer not to say), grade (First Year, Second year, Third year, Fourth Year, and Others), and whether international student/ exchange student or not.

All of the variables were measured using survey data. To the extent possible, we relied heavily on previously used and validated instruments (see Appendix). Self-efficacy scales use the Self-Efficacy Scale (6 items) developed by the Imperial College of London (2019). General self-efficacy scale measures the extent to think about yourself and your life in general while using LSP. Participants were asked to rate on a five-point Likert scale from: 1 = Not at all confident, to 5 = Extremely confident.

Team effectiveness was measured using 19 items representing 8 categories, based on a subset of the Teamwork Scale by the National Health Service and London Leadership Academy (2014). This questionnaire examines the assessment of team effectiveness of your team from the perspective of eight dimensions (purpose and goals, roles, team process, team relationship, intergroup relations, problem solving, passion and commitment, and skills and learning). Participants are asked to rate on a five- point Likert scale: 1 = Strongly Disagree, 5 = Strongly Agree.

3.4 Data Collection Procedures

To evaluate students' learning outcomes across this series of projects, identical questionnaire

surveys were conducted at two time points: before (pre) and after (post) the implementation of the project. The questionnaire was an anonymous online self-evaluation survey (Google Forms), and the instructions of this survey clearly stated that responses were anonymous and would have no bearing on students' grades.

3.5 Data Analysis

The dataset consisted of 8 participants in pre-survey, and 11 participants in post-survey. Table 1 summarizes the demographic characteristics of the participants. For each variable, means, standard deviations, and sample sizes are presented in Table 2.

To examine the reliability of the scales, Cronbach's α coefficients were calculated and exceeded the common threshold of 0.70 (Self-efficacy: 0.875; Team effectiveness: 0.894), indicating acceptable internal consistency.

To evaluate changes in students' learning outcomes, we conducted Welch's t-tests to compare the mean scores of learning outcomes (self-efficacy, and team effectiveness) between the pre-survey and post-survey results for the international collaborative project using LSP. Before conducting the t-tests, we performed Levene's tests to examine the homogeneity of variances. The results indicated that homogeneity of variance could not be confirmed for all variables. In addition, because the sample sizes were relatively small and unequal, Welch's t-tests, which do not assume equal variances, were adopted.

Table 1: Demographic characteristics of the participants

	Pre-survey N=8	Post-survey N=11
Gender		
Female	0	3
Male	7	8
Prefer not to say	1	0
International student or Exchange student		
Yes	3	3
No	5	8

3.6 Results

The results of the t-test are shown as Table 2. Overall, mean scores increased for all items of self-efficacy and team effectiveness. However, as shown in the results of Welch's t-test, the increase in self-efficacy from pre- to post-survey was not statistically significant (mean difference: 0.076, t (16) = -0.24, p = 0.82)[1]. In contrast, team effectiveness demonstrated a statistically significant increase (mean difference: 0.431, t (12) = − 2.16, $p<0.05$).

When examining the eight dimensions of team effectiveness individually, significant gains were observed in "Team Processes" (mean difference: 0.648, t (14) = -2.86, $p<0.01$), "Problem Solving" (mean difference: 0.550, t (13) = -2.14, $p<0.05$), and "Skills and Learning" (mean difference: 0.540, t (15) = -2.51, $p<0.05$). "Purpose and Goals" (mean difference: 0.424, t (13) = -1.98, $p<0.10$) also showed a marginally statistically significant increase. No significant changes were found in the other dimensions.

Table 2: Results of t-test between pre- and post- survey

	Pre-survey N=8		Post-survey N=11		*t*	*df*	*p*
	Mean	*S.D.*	*Mean*	*S.D.*			
Self-efficacy (6 items)	3.33	0.64	3.41	0.75	-0.24	16	n.s.
Team effectiveness	4.00	0.48	4.43	0.35	-2.16	12	**
Purpose and goals	4.00	0.50	4.42	0.40	-1.98	13	*
Roles	3.92	0.61	4.33	0.49	-1.59	13	n.s.
Team processes	3.96	0.52	4.61	0.44	-2.86	14	***
Team relationships	4.31	0.53	4.32	0.84	-0.02	17	n.s.
Intergroup relations	4.06	0.68	4.36	0.55	-1.03	13	n.s.
Problem solving	4.00	0.60	4.55	0.47	-2.14	13	**
Passion and commitment	4.13	0.79	4.59	0.44	-1.51	10	n.s.
Skills and learning	3.69	0.46	4.23	0.47	-2.51	15	**

*p < .05, **p < .01, ***p < .001

3.7 Interpretation of Findings

This research project aimed to compare the means of learning outcomes (self-efficacy, and

1 There were no significant mean differences between each question.

team effectiveness) between the pre- and post-survey results with students from Meiji University who participated in this LSP-based international collaborative learning project. As an indicator of the learning effects of LSP in an international context, Welch's t-tests were conducted to examine mean differences between pre- and post-experiment surveys.

The results show that the mean for team effectiveness was substantially higher after the project than in the pre-survey, whereas self-efficacy showed no significant change. This lack of increase in self-efficacy may be related to cultural tendencies among Japanese students, who are often cautious in self-evaluation; for instance, they may underestimate their own abilities, avoid over-claiming confidence, or express modesty compared to international peers.

In contrast, the significant improvement in team effectiveness indicates that LSP served as a powerful tool for facilitating teamwork, enabling students to visualize potential ideas and opinions, share their own perspectives, and build stronger collective processes. In particular, "team processes" showed the largest improvement as compared to pre-survey, suggesting that LSP helps students guide effective solutions and resolve issues quickly. Furthermore, regarding "problem solving" and "skills and learning," high performance was observed in terms of both individual responsibility for team outcomes and a proactive attitude toward reflecting on results. This indicates that students engaged in collaborative learning while maintaining a balance between responsibility and achievement orientation through collaborative activities. In addition, the significant increase in "purpose and goals" suggests that the visualization of ideas with LSP contributed to the development of a shared sense of purpose among team members.

Nevertheless, the small sample size limited the statistical power and the use of an anonymous survey with students from a single university raises concerns about generalizability. Despite these limitations, the findings suggest that incorporating LSP into course design can be effective as a tool of visualizing ideas and opinions that cannot be fully expressed through language alone, thereby facilitating active exchange of opinions in team-based learning activities.

4. Qualitative Study

This study examines the qualitative learning outcomes of embedding LEGO Serious Play (LSP) into a Sustainable Development Goals (SDGs) class at Meiji University, Japan, in January

2025. The analysis draws primarily on semi-structured interviews with third-year students who participated in LSP sessions, alongside observational data collected during an embedded LSP session with first-year students. Participants included both home students enrolled in the School of Business Administration and international exchange students. Using a coding approach and focusing on students' experiential learning (Kolb, 2015), the study illustrates that LSP promotes creativity, deepens engagement, and enhances group dynamics—three dimensions that are critical for cultivating intercultural competence, leadership capacity, and critical analytical skills.

4.1 Objective and Methodology

The aim of this study was to explore how LSP facilitates experiential learning in understanding the SDGs. UNESCO (2020) has emphasized the importance of promoting action-oriented competencies in education for sustainable development. This study focused particularly on LSP's impact on creativity, engagement, and intercultural collaboration. Creativity enables students to approach problems from multiple perspectives, fostering flexibility and innovation—key traits for effective leadership and critical thinking (Runco & Acar, 2012). Deep engagement through hands-on approaches such as LSP supports active knowledge construction, reflection, and metacognitive development, which are central to critical analysis and informed decision-making (Kolb, 2015). Intercultural collaboration exposes students to diverse viewpoints, enhancing empathy, adaptability, and cross-cultural communication (Deardorff, 2006). Together, these dimensions cultivate the capacity to navigate complex global contexts, exercise evidence-based judgment, and lead effectively.

Qualitative data were collected through in-person semi-structured interviews and participant observation conducted during LSP-based classes at Meiji University on 10 January 2025. Interviews explored students' prior experience with LEGO, their perceptions of LSP before and after the session, and suggestions for future applications. Participant observation during a 90-minute integrated session captured students' real-time engagement, group dynamics, and learning outcomes compared with conventional lectures and seminar discussions (O'Leary & Cui, 2018). Detailed fieldnotes, photographs, and reflective notes were incorporated into the analysis to support triangulation and enhance reliability (Patton, 2015).

4.2 Data Collection

Semi-structured interviews, lasting approximately 30 minutes, were conducted with twelve third-year students (six international and six home students) who had previously participated in an LSP session as part of the Mitsubishi Memorial Foundation for Educational Excellence project in the 2024-2025 academic year. Participant observation data were collected from a module involving 67 first-year students in the Global Resources English Applied Track (GREAT) program. The session began with a brief lecture followed by an LSP workshop facilitated by Mr. Ishihara, in which students engaged with the Triple Bottom Line (TBL) framework through group activities. Fieldnotes and reflective commentary were the primary sources of observational data. Additional insights were drawn from lecture sessions the researcher conducted in December 2023 (also with GREAT first-year students), providing a longitudinal perspective on changes in student engagement and reflective thinking, and enabling comparison between LSP and conventional lecture-based approaches.

4.3 Analytical Framework

A coding analysis was employed to systematically examine all collected data, organizing similar events and responses into a coherent coding scheme aligned with the study's objectives (Saldaña, 2021). This approach facilitated a comprehensive understanding of the impact of LSP on students' cognitive, social, and creative learning outcomes. The study integrated two distinct sources of data to enable methodological triangulation, enhancing both the validity and depth of the analysis (Williams & Moser, 2019).

Semi-structured interviews captured students' perceptions of the LSP sessions and their self-recognition of changes in learning (Creswell & Poth, 2024). Participant observation complemented these findings by documenting real-time engagement, group dynamics, and facilitation processes, providing insight into how students interacted with the method and with each other in situ (Borgnakke, 2004). By integrating interview and observation data, the study captured both reported and enacted aspects of learning, highlighting how LSP fosters reflective thinking, collaborative problem-solving, and creativity. This dual-method approach supports a more robust interpretation of how experiential and creative pedagogies influence higher education learning outcomes (Patton, 2015).

The analysis focused on key learning outcomes in relation to experiential learning, drawing on Kolb's (2015) theory, which emphasizes learning through active participation,

reflection, and conceptualization. Three dimensions were considered: cognitive engagement, social interaction, and creative learning. Cognitive engagement examined students' internalization of sustainability concepts, including the SDGs and the Triple Bottom Line, alongside the development of critical thinking, articulation of ideas, logical reasoning, and reflective skills, taking prior knowledge into account (Biggs & Tang, 2011). Social engagement addressed collaborative dialogue, intercultural communication, and group dynamics, exploring how students negotiated meanings across linguistic and cultural differences and responded to facilitator prompts, emphasizing the role of facilitation in fostering equitable participation (Garrison, 2017). Creative and experiential learning captured how students used LEGO to visualize abstract concepts, employ symbolic thinking, and engage in problem-solving, highlighting how hands-on manipulation supports reflection and stimulates innovative thinking (Sawyer, 2012). This framework provides a holistic understanding of how LSP fosters cognitive, social, and creative development in higher education students.

4.4 Key Findings

This study shows that LSP promoted cognitive engagement, particularly in the internalization of subject knowledge; social interaction, through group dynamics; and creative learning, represented by visualizing abstract concepts.

4.4.1 Participant Observation Data

Participant observation during the integrated 90-minute LSP session provided insights into students' engagement, group dynamics, and the role of the facilitator. On 10 January 2025, first-year students in the GREAT program were asked to discuss the Triple Bottom Line (TBL) theory in terms of its three factors—people, planet, and profit—and its three connectors —bearable, viable, and equitable. Most students were home students, including some who had returned from overseas. Students were divided into groups of six and participated in guided LSP activities across four classrooms. Each group had at least one teaching assistant, while Mr. Ishihara facilitated the overall process. Classrooms were connected via a Teams meeting, allowing for coordinated instructions and cross-classroom monitoring.

Students reflected on the lecture about TBL and its connectors and were asked to choose one factor to focus on and share through LEGO models. Unlike conventional group discussions, where some students may remain silent while others dominate, every student had

an opportunity to speak, enhancing engagement. For example, when discussing which TBL factor played the most significant role in sustainable solutions, in a group of four, three students highlighted "people"—emphasizing communication, support, and confidence—while another emphasized the environment as shaping individual character. They articulated their reasoning by drawing on prior knowledge from other classes about the SDGs to explain why they made their decisions. Students also questioned each other about the meaning of their models, fostering dialogue and deeper reflection. Observations indicated that sharing their LEGO models one by one posed no issue for students, and most were comfortable expressing views different from others. This contrasted with previous sessions I delivered, where students who lacked confidence in the subject tended to remain silent or follow the opinions of peers without contributing their own ideas.

Some students were initially unfamiliar with asking questions of one another. While some had more questions than others about their LEGO models, and others were initially able to ask only one question, facilitator prompts encouraged more open engagement. Those initially hesitant to respond were given opportunities to articulate their reasoning, enhancing discussion. In one group of four students (three male, one female), two male students were notably more talkative, while the other two participated less. At one point, a male student directly asked me, the facilitator, what I thought was the most important factor, seemingly expecting a "right" answer. I redirected the question to the group, prompting them to explain their models and elaborate on their reasoning. Facilitation was brief, but the students soon resumed discussion independently, improving group dynamics and encouraging deeper mutual understanding.

4.4.2 Interview Data

Interviews with third-year students who had previously experienced LSP revealed generally positive feedback. Students highlighted the hands-on, practical nature of the activity, noting that building LEGO models facilitated engagement with abstract SDG concepts in a more concrete and memorable way. Several students emphasized enhanced creativity; constructing with LEGO enabled visualization and communication of complex ideas in novel forms. One participant noted that imaginative thinking was required during construction, while another highlighted meaningful use of colors, such as black to symbolize negative aspects, even if the symbolism was not always retained.

Students also reported that LSP encouraged logical explanation and verbal articulation, as they needed to clearly explain their constructions to others. While some found expressing their thoughts with limited LEGO pieces challenging, this constraint fostered deeper reflection and more deliberate communication. The method also highlighted language dynamics within diverse groups, as participants had to choose wording carefully, particularly when English was not their first language, enhancing awareness of inclusive communication practices.

Students suggested that LSP could be applied beyond the SDG context, identifying its potential as a tool for stimulating critical thinking and collaborative dialogue in other modules. Overall, the findings indicate that LEGO Serious Play enhanced creativity, supported logical reasoning and communication, and fostered intercultural awareness, contributing positively to students' learning outcomes.

4.5 Discussion of Implications

This study shows that LEGO Serious Play (LSP) has strong potential as an experiential pedagogy in higher education, particularly in sustainability-focused curricula. By requiring students to externalize their ideas through models and discussion, LSP fostered deeper conceptual understanding, creativity, and collaboration compared with conventional lecture-based approaches.

The findings reinforce arguments for integrating active, experiential methods into higher education (Kolb, 2015). The use of LSP demonstrates how experiential and hands-on learning methods can complement lecture-based approaches by fostering deeper engagement, creativity, and reflective dialogue. By doing so, LSP democratized classroom participation, allowing students who are often reluctant to speak in traditional formats to contribute equally. This is especially relevant in the Japanese context, where cultural norms may inhibit open questioning or critique. Facilitated well, LSP provided a structured space for inclusive participation, demonstrating its potential to overcome cultural barriers to engagement.

The ability of LSP to encourage articulation of ideas, negotiation across languages, and intercultural collaboration highlights its potential as a tool for internationalized classrooms. In contexts where students come from diverse cultural and linguistic backgrounds, LSP can function as a leveler that reduces barriers to communication and empowers more inclusive participation. This carries implications for the design of global leadership and intercultural competence training in universities.

By making frameworks such as the Triple Bottom Line tangible, LSP helped students move from abstract discussion to concrete, context-specific applications. This hands-on approach encouraged systems thinking and collaborative problem-solving, both of which are essential for tackling sustainability challenges. The method thus aligns with calls from UNESCO (2020) to promote action-oriented competencies in education for sustainable development.

The role of the facilitator emerged as critical. Strategic prompts and culturally sensitive guidance helped students articulate ideas and engage more fully. For curriculum design, LSP may work best when embedded alongside traditional teaching, offering balance between knowledge delivery and active participation. While large-scale adoption may be resource-intensive, selective integration into modules on leadership or sustainability appears both feasible and impactful.

Overall, the study findings imply that innovative, participatory teaching tools such as LSP can make a significant contribution to preparing students for the complex problem-solving and collaborative demands of sustainability challenges. By embedding these methods into mainstream teaching, universities can strengthen their role in cultivating the critical thinking, creativity, and intercultural awareness needed for addressing global issues

The study is limited to one institution in Japan, with a relatively small sample size. Comparative and longitudinal research would help establish whether the competencies developed through LSP persist and transfer to professional contexts. Future studies could also explore applications of LSP beyond sustainability, for example in innovation management or public policy.

5. Conclusion

The study described in this paper was carried out as both an educational project and a preliminary evaluation of the effectiveness of LSP as an educational method to promote engagement and creative thinking in issues related to sustainability management. Both aspects are equally important. Educationally, we aimed to contribute to the education of those participating in the project, by providing them with an opportunity to engage with sustainability issues in a communicative and creative way. The findings also provide an opportunity to evaluate and develop the programs both at Meiji University and the Lancaster

and Seattle Pacific Universities. At the same time, we sought to learn from this project about the effectiveness of introducing techniques such as LSP into educational programs, particularly when using it as a tool for online collaboration.

The primary participants in this project were business major undergraduate students at Meiji University in Japan, most of whom will likely go on to become managers in global corporations and other organizations. Such students will inevitably work in situations where they face increasing challenges from social and environmental issues related to sustainability. Being able to address such problems effectively will require considerable creativity and imagination. It will also be dependent on a growing recognition of the responsibilities of organizations to a broader range of stakeholders than the traditional focus on generating financial profits or growing the economy. In other words, they must recognize the importance of a Triple Bottom Line. In the future, people in positions of management, such as those the students in this project will likely undertake, will need to be able to prioritize the needs of the people impacted by their organization's activities as well as the natural environment on which it depends for its resources. This is a huge long-term goal both for global societies and the education which shapes them. Admittedly, even a massive research project could do little to address such issues. Nevertheless, the first step of any change is to see what may be possible at a small scale. The quantitative and qualitative parts of this project have sought to explore whether progress can be made in education through raising awareness of issues through creative engagement using LSP. LSP itself is methodology that has already established itself as an effective tool for communication, collaboration, and creative thinking. In other words, it is a method appropriate for the kind of innovation we believe is needed in management education. As already noted in the sections above, the findings reported here have limitations in terms of their generalizability and applicability to other contexts. Nevertheless, what we were able to observe was promising. Even in the short span of this project we were able to observe meaningful developments in attitudes and a ready adaptation to the creative demands of LSP. That neither attitudes nor creativity are immutable should not come as a surprise to educators whose work is premised on this assumption. Nevertheless, it was encouraging to be able to observe some level of impact. If, as noted in the introduction, the ages between around 18 and 22 are central to shaping the identity and direction of human life (Draaisma, 2006), then the evolution of thinking developed during tertiary education may also play out in the participants lives, and the lives of those they interact with. Though impossible to know

whether this project may have relevance to this, we would like to think that has had a potentially positive impact. Moreover, we hope that this project itself has outlined a sustainable direction for educational research with tomorrow's leaders.

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Appendix: Survey Instruments

Self-efficacy Scale (1 = Not at all confident and 5 = Extremely confident)

Please think about yourself and your life in general when you answer the following questions:

i. How confident are you that you will be able to achieve most of the goals you have set for yourself?
ii. How confident are you that you will accomplish difficult tasks?
iii. In general, how confident are you that you can achieve outcomes that are important to you?
iv. How confident are you that you will succeed at most any endeavor you set your mind to?
v. How confident are you that you will successfully overcome many challenges?
vi. When things are tough, how confident are you that you can still perform well?

Team effectiveness (1 = Strongly Disagree and 5 = Strongly Agree)

a. Purpose and goals

- Our team has a meaningful, shared purpose.

- We are strongly committed to a shared mission.
- We focus on big-picture strategic issues as much as on day-to-day activities.

b. Roles

- Team members clearly understand their roles.
- When an individual's role changes, an intentional effort is made to clarify it for everyone on the team.
- Team members understand one another's roles.

c. Team processes

- Team problem solving results in effective solutions.
- We address and resolve issues quickly.
- People on my team are rewarded for being team players.

d. Team relationships

- Team members appreciate one another's unique capabilities.
- Team members are effective listeners.

e. Intergroup relations

- We are able to resolve conflicts with other teams collaboratively.
- We seek to arrange our priorities to meet the needs of other work groups.

f. Problem solving

- Team members take personal responsibility for the effectiveness of our team.
- Team members maintain a can-do approach when they encounter frustrating situations.

g. Passion and commitment

- Working on our team inspires people to do their best.
- My team has a strong sense of accomplishment relative to our work.

h. Skills and learning

- We have the skills we need to do our jobs effectively.
- We always ask ourselves, "How can we do better tomorrow what we did today?"