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RESEARCH ARTICLE

Sustainable Development Goals: A Case of the Community College Student Initiative Project

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ABSTRACT

Understanding and awareness of the United Nations Sustainable Development Goals are critical in ensuring students are geared towards protecting the future for themselves and others. This qualitative case study research design aims to increase the level of awareness and engagement among our students to create sustainable leaders and foster more sustainable organizations, households, and communities at the micro and macro levels. A design thinking workshop was used to raise students' level of awareness and engagement. An open-ended survey was used to gather data on students' views of how the business community and higher educational institutions can play their part in the nation's sustainability issues. The design thinking workshop resulted in the development of a sustainable development project proposal on renewable energy. Results of the survey revealed that students were not fully aware of the United Nations Sustainable Development Goals. The study recommends that higher educational institutions need to play a more critical role in educating students about the SDGs and need to infuse sustainability within the curriculum.

Keywords: Awareness, engagement, higher educational institutions, sustainable development goals.

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1. Introduction

The United Nations' Sustainable Development Goals were developed in September 2015 after the expiration of the Millennium Development Goals (MDGs) (Yuan *et al*., 2021), which fell short of transforming the world into a more sustainable place for our citizens. The aim of the sustainable development goals (SDGs) is to promote a safe and sustainable environment while promoting the lives of people, protecting the environment, and for prosperity (Leiva-Brondo *et al*., 2022). Seventeen interrelated sustainable development goals were developed, which, according to Krishna *et al*. (2022), are related to economic, political, and environmental issues. The United Nations sustainability goals are concerned with no poverty (SDG 1), zero hunger (SDG 2), good health and well-being (SDG 3), quality education (SDG 4), gender equality (SDG 5), clean water and sanitation (SDG 6), affordable and clean energy (SDG 7), decent work and economic growth (SDG 8), industry innovation and infrastructure (SDG 9), reduced inequalities (SDG 10), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), climate action (SDG 13), life below water (SDG 14), life on land (SDG 15), peace and justice strong institutions (SDG 16), and partnerships for the goals (SDG 17) (United Nations, 2016).

The Small Island Developing States (SIDS), which includes the Caribbean developing countries, have agreed to include the SDGs in their country's development plans to create strategies to achieve these goals (United Nations, 2016). The 2030 agenda for sustainable development recognizes that no one should be left behind on the sustainability initiative. Therefore, the youths of today play a vital role in ensuring sustainable development goals are achieved. The United Nations stated that the SDGs should bring awareness to "youth involvement in politics, financial inclusion, infrastructural development, health, and environmental issues" (United Nations, 2016, p. 11). Thus, programs and policies are desired by member states to achieve the SDGs, and higher education institutions (HEI) have a significant role to play in ensuring awareness and engagement.

Higher educational institutions are seen as the basin of knowledge and skills and, as such, have a role to play in training students for life-long learning and becoming future leaders. Thus, their mandate is to ensure that these

future leaders are well-equipped to solve problems relating to sustainability. Educational institutions are vehicles that will provide students with a level of awareness and engagement. These institutions may create a culture of sustainability through teaching, problem-based research, and stakeholder engagement (Leiva-Brondo *et al*., 2022). Manolis and Manoli (2021) agree that when the awareness of the SDGs is heightened within the HEIs, it could inspire and motivate young people to want to do better to sustain their society. Goal number 4 (Quality Education) is the hallmark of all HEIs and focuses on the importance of education in global sustainable development. It is through quality education that students will be able to develop skills for lifelong learning (Yuan *et al*., 2021), achieve gender equality (SDG 5), reduce inequalities (SDG 10) and eradicate poverty (SDG 1).

Sustainability is an essential component of 21st-century organizations that aim at maintaining a healthy, well-balanced, and meaningful life for the present generation without at the same time compromising the future generation's ability to meet their own needs (Odoom *et al*., 2023). Thus, the role of students in the awareness and engagement of the SDGs towards the sustainability of the economy should not go unnoticed. Students' engagement with the SDGs may be done through various programs such as internships, cultural programs, assignments, and corporate social responsibilities (Jain & Jain, 2019). It is through our students' involvement in these programs and initiatives that we will experience a more sustained and competitive society.

2. The Background

The mission of most Higher Education Institutions outlines the importance of strategically creating an intangible knowledge resource base for its students (Pacheco & Franco, 2023). This statement endorses the need for students to be optimally prepared to effectively contribute to the community and create relationships within the community that will result in sustainable growth and development. Students can play a role in creating a sustainable institution as they learn about environmental issues and adopt sustainable practices and behaviour (Calder & Clugston, 2003). The various programs and curricula offered by the institution do not currently include the importance and relevance of sustainable development goals to nation-building and an environment which will foster continuous growth. Student awareness of SDGs will guide them in promoting best practices and solving current environmental problems that impede sustainable development (Pietrzak, 2022).

Creating a culture of sustainable development in the institution lays the foundation for the sustainable development of the institution and the community it serves. Other countries worldwide have been concerned about the need to bring awareness to SDGs through higher education institutions and have created regulations to ensure equality, community development, openness and creativity are embedded in the HEIs curriculum (Shriberg & Harris, 2012). Students' application of any of the seventeen SDGs in their day-to-day activities will create a sustainable environment for future generations. Balčiūnaitienė (2016) further states that a successful implementation of the foundation for sustainable development will need to include financial and other resources, and this is where support by the institution's leadership is paramount. Community leaders and other sectors of the economy are also key players in its success, and financial and practical support will also assist in cementing a foundation of sustainability.

HEIs are seen as agents of change as they promote research and varying dimensions of education and participate in outreach programmes (Bhowmik *et al*., 2018). Knowledge and implementation of SDGs will create a culture of continuous research to achieve specific goals and sustainability. Continuous research in this sector allows for development and improvements that students will benefit from. Current students are not research-centred, which impedes their knowledge growth in sustainable development, but they can assist in improving their environment. Students' comprehension of SDGs and possible solutions to challenges will promote better citizens and community development.

3. The Aim

The main aim of the Student Sustainable Initiative Project (TSSIP) is to increase the level of awareness and engagement of the college's student body with the SDGs, thus fostering more sustainable-oriented graduates.

4. The Purpose

To increase the level of awareness and engagement among our students to create sustainable leaders and foster more sustainable organizations, households, and communities at the micro and macro levels.

5. The Objectives

- To increase awareness of the SDGs, we will host sustainable development (SD) talks across campus.
- To increase the level of SDG engagement by implementing a student-tailored, people-centered design thinking sustainable-oriented project.
- To foster more sustainable-oriented students and future leaders of the country
- To provide students with the practical skills and opportunity to identify, define and solve real issues faced by society.
- To grow the level of industry commitment and assistance through people-centered research.

6. The Problem

Students lack awareness and engagement of the SDGs and the impact of sustainability on their communities within the Caribbean region. Public awareness of the SDGs has become a major concern worldwide. According to Odoom *et al*. (2023), global awareness of the population of

thirteen countries ranged from 16% of the SDGs awareness in Russia to 44% in India. Leal Filho *et al*. (2023) stated that higher education institutions are providing valuable inputs toward the implementation of the SDGs worldwide; however, the engagement of these goals is unclear.

7. Research Questions

How can higher education Institutions develop a culture of SD that fosters students' awareness and engagement through problem identification and problem-solving?

1. How can HEIs increase awareness and engage students in practical skills that include problem identification and solving issues that impact society?
2. What initiatives can be implemented by HEI to best engage students in the engagement of the SDGs using a design thinking model?
3. How can industry players partner with HEIs to foster a culture of sustainability among students and the public at large?

8. Conceptual Framework

Sustainable Development Goals (SDGs) are the focus points for most developing nations as they create objectives and targets to achieve economic growth and a sustainable society that will allow its citizens to function effectively in the growing economy. Purcell *et al*. (2019) believe that Higher Education institutions can assist in shaping new ways to achieve these goals through research and technological advancement. The conceptual framework for this research, as presented in Fig. 1, outlined the step-by-step approach that one institution used to involve students in identifying problems and providing solutions to the problems. The framework outlines the involvement of students' awareness in issues that impact their immediate environment through a design thinking methodology. The SDGs developed by the United Nations were summarized and presented to students in a forum that allowed them to have deep discussions on these goals and their impact on their immediate environment. The framework includes the various roles the institution can play in achieving the goals through partnership with community members, as well as the business leaders' impact on the institution if and when a partnership is formed to achieve sustainability. The synergy of all these components in the conceptual framework guided the research questions and the analysis and discussion of each question through a thematic approach. This conceptual framework addresses the gap in literature from the student's perspective on SDGs and possible solutions using the design thinking methodology.

9. Literature Review

9.1. HEI and the SDGs

The global concept of Sustainable Development (SD) can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). It entails looking at sustainability economically, environmentally, and socially and has multiple stakeholder involvement (Olawumi & Chan, 2018). The new frontier of SD is the UN Sustainable Development Goals (SDGs), which was launched in 2015 with a 2030 agenda. These goals seek global efforts to achieve SD via its three pillars in a balanced and integrated manner (United Nations, 2015). They serve as a strong mobilizer for all types of institutions worldwide (public and private) to increase their efforts (Blasco *et al*., 2020) and collaborate in ensuring true SD is realized for all.

The discussion of Higher Education Institutions (HEIs) playing a pivotal role in achieving true SD is relatively new (Aleixo *et al*., 2016; 2018a; Blasco *et al*., 2020; Farinha *et al*., 2019; Leal Filho *et al*., 2017; Montenegro de Lima *et al*., 2020). The SDGs have been viewed as a means for HEIs to conquer their challenges in achieving sustainability (Leal Filho *et al*., 2017). HEIs, prior to the goals, have always appreciated the significance of SD. However, full integration into their activities or systems has not been realized (Aleixo *et al*., 2018b).

UNESCO (2014) in Japan for its World Conference in 2014 summoned HEIs "to further strengthen and scale up" Education for Sustainable Development (ESD). Accrediting the advancement of education in all areas and levels as pertinent to societies' SD. Citizens should be furnished with values, knowledge, and skills to make decisions that reinforce working and living in a sustainable manner. This could be accomplished through ESD, which entails not just influencing policies but also increasing awareness of the goals and developing projects of good practice in areas and levels of learning and education. Many studies have called on HEIs to envelop ESD (Leicht *et al*., 2018; Thomas, 2016; Weik *et al*., 2015).

Barth and Rieckmann (2012) called for HEIs to go beyond traditional means of transferring knowledge to students about SD. They called on educators to develop competence-oriented, participatory approaches within their institutions. As such, many HEIs made structural changes to strengthen their sustainability efforts by modernizing their operations while increasing research, education, and community outreach activities (Wals, 2014).

9.2. HEI and the SDGs Awareness and Engagement

HEIs have a significant role to play in the SD of their general public (Kräusche & Pilz, 2018). As the leaders in innovation, education and research, HEIs are crucial in bringing about societal change and developing economies and societies (Ceulemans *et al*., 2015; Lozano *et al*., 2015). Theoretically or practically, they are decisive actors in verbalizing societal transformation (Montenegro de Lima *et al*., 2020). Segalàs *et al*. (2010) found that HEIs were morally obligated and responsible for ensuring that their graduates were leaving with the acute understanding that they are tasked with advancing future generations' quality of life.

Due to the increase in issues revolving around the complexities of survival, politics, societies and peace, sustainability has become a worldwide concern (Veiga Avila

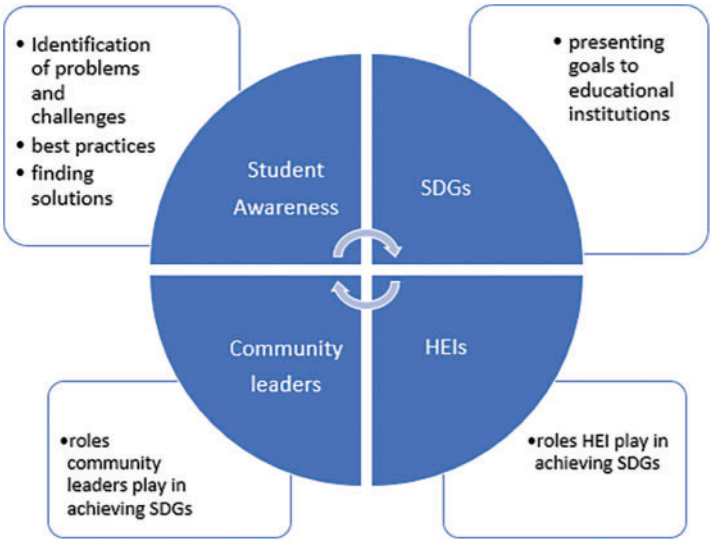

Fig. 1. The conceptual framework.

et al., 2019). There has been an uptick in HEIs worldwide, engaging in the concept of sustainability and filling the existing knowledge gap (Soini *et al*., 2018). To join the global focus on a sustainable future, HEIs have established in their core curriculum, communities, operations, activities and research sustainable initiatives (Casarejos *et al*., 2017). They have also increased their efforts in contributing to and collaborating with others to generate values, attributes, and behaviours that are sustainably oriented within the future generation (Sonetti *et al*., 2019).

To realize the SDGs, Hajer *et al*. (2015) noted a need for new and a myriad of change agents like HEIs. Leal Filho (2018) noted that HEIs had the unique ability to foster impartial and resilient societies as "knowledge disseminators, behaviour consolidators and idea innovators" through their distinguished learning environments and campus life experience. Altogether, it inaugurates universal consideration for sustainability orientation. HEIs can help individuals become knowledgeable of the process necessary to accomplish the SDGs (Frandoloso & Gasparetto Rebelatto, 2019).

Many also believe HEIs must have SD policies in place to successfully handle sustainability-related issues. This would also serve as an indicator of the institution's commitment to achieving its goals (Leal Filho, 2018). To date, HEIs have contributed to the SDGs by helping with local and national implementation, embodying ESD while ensuring that governance and operations align with the SDGs, incorporating SDGs into university reporting, and most significantly, facilitating transdisciplinary and interdisciplinary research (Montenegro de Lima *et al*., 2020).

HEIs are viewed as a major factor in the accomplishment of the SDGs (Vilalta *et al*., 2018). Goal 4, Quality Education, is directly related to the teaching and learning of the goals, which requires the actions of HEIs (Blasco *et al*., 2020). The fourth objective of the goal is education as the means of achieving SD and the pushing of the goals (Kestin *et al*., 2017). This strongly signals the importance of HEIs as a means of ensuring all other goals are achieved (United Nations, 2015). Target 4.7 aims to ensure that "all learners acquire knowledge and skills needed to promote sustainable development" by 2030 (United Nations, 2015, p. 5). This has led to increased involvement in Higher Education for Sustainable Development.

With their wide reach, HEIs can promote the goals (Rosen, 2019), thus increasing the level of awareness and engagement of the goals. According to Leal Filho *et al*. (2019) and Paletta and Bonoli (2019), HEIs, away from assisting in implementing policies to achieve the SDGs, must aid in increasing awareness among their stakeholders, particularly their students. They are tasked with showing students their part in the 2030 SDGs agenda and supplying them with skills and mindsets through knowledge transfer (Perovic & Kosor, 2020; SDSN, 2020).

However, HEI's bid to embody education for SD and engage the goals faces challenges (Fiselier *et al*., 2018), particularly with staff involvement (bringing awareness to those who may not understand the relevance of SDG or ESD and how it is linked to their discipline) and lack of funding. Many studies have focused on examining the way HEIs research sustainability and the SDGs and how the goals are integrated into the learning objectives of the various programs in the institution (Kioupi & Voulvoulis, 2020; Korfgen *et al*., 2019; Shiel *et al*., 2020). There is evermore a call on HEIs to utilize and experiment with new, innovative learning methods, contents, and transformative avenues (Leal Filho *et al*., 2019) within the institution to increase awareness and engagement of the goals.

9.3. Design Thinking Methodology

The design thinking methodology has recently gained extraordinary consideration within the field of business and academia as a potential means of cultivating innovation across a broad scope of organizations and challenges (Liedtka, 2018). Defined as a human-centred approach to innovation that puts observation and discovery at the forefront of the innovation process (Gruber *et al*., 2015), design thinking can revolutionize how one sees and addresses problems (Plattner *et al*., 2015). The methodology draws from the user multiple probable solutions while using numerous techniques that influence all participants to

think 'outside the box' in pursuing innovative and creative solutions (Ambrose & Harris, 2010).

The ability to amalgamate information from several sources makes the approach multidisciplinary (Kimbell, 2011; Wolniak, 2017). Its main focus is the innovativecapacity of the user (Bordbar *et al*., 2022; Brzoska, 2016) in generating fresh ideas (Dorst, 2012). The users of the methodology then bring their ideas into actuality and alter all facets of life (Wolniak, 2017). The process constitutes five elements (Dam & Siang, 2022; Waloszek, 2012), which do not have to be sequential and can run simultaneously:

> 1) Empathize Stage: The goal of this stage is to empathize with the person/s who are affected by the problem/s and conceptualize the various ways to solve them.
> 2) Define Stage: This stage brings to center the considerations of the problem gained from the empathy stage.
> 3) Ideate Stage: Here, numerous innovative ideas for the problem are conceptualized.
> 4) Prototype Stage: A preliminary model is created to allow for flaws to be recognized before heading into the testing stage and
> 5) Test Stage: At this stage, feedback is important as it helps refine the prototype and determines whether the defined problem has indeed been fittingly addressed.

9.4. HEI and Design Thinking Methodology

Design thinking is the latest sensation in education. It is seen as a dynamic tool that enhances the learning and teaching process. It affords educators flexibility, renders easily accessible structures to the intensity, and guides creativity for dealing with practical dilemmas (Razali *et al*., 2022). Various educational researchers and scholars have utilized the tool to enhance pedagogical approaches and curricula (Laurillard, 2013; Tsai *et al*., 2023). It is viewed as a means to evolve the 21st Century learning and teaching skills by discovering and processing data that considers people and their feedback through communication, critical thinking and creativity (Glen *et al*., 2014; Ray, 2012).

Kijima *et al*. (2021) argued that the approach gave students the ability to work in multidisciplinary teams to achieve successful problem-solving of everyday issues through positive design-led change. Pendleton-Julian and Brown (2015) also stressed the value of teacher education established on design. This was based on the increased call for teachers to use new approaches and creativity within the 21st century context.

There are challenges that are faced by the educational world when using the methodology to overcome world issues (Harden & Moore, 2019; Laferriere *et al*., 2019; Panke, 2019). One challenge is preparing the materials to ensure students' effective learning and teaching (Panke, 2019; Retna, 2016; Tseng *et al*., 2019). Another is the lack of experience with using the design by educators (Anastasiadis *et al*., 2020; Clark *et al*., 2020). Harden and Moore (2019) found that this led to high levels of misunderstanding among students. They realized that this may be due to the short time given to educators to adopt the approach. This has led to the approach having a limited impact on students (Baniya *et al*., 2019).

For students, being introduced to the design thinking methodology for the first time can be confusing as they navigate the resources and steps (Panke, 2019). Another is the lack of creativity that arises when solving the problem using the approach (Clark *et al*., 2020; Henriksen *et al*., 2017). This may be due to the lack of training the educator may have with design thinking and due to the entrenched traditional way of thinking the students have been exposed to in the learning and teaching process. According to Linton and Klinton (2019), a lack of good ideas also posed a challenge to using the methodology, as students would lose interest in completing the work. Lastly, there are teamwork challenges resulting from difficulties within the classroom or conflicts among peers. This usually hindered group cooperation, which is an essential factor of the design thinking methodology (Kruger, 2019; Lynch *et al*., 2019).

10. Methodology

The study utilized a qualitative case study approach to explore students' level of awareness and engagement with the United Nations Sustainable Development Goals and how sustainability is practiced within organizations.

10.1. Population, Sample, and Sampling Methods

To better assist students in their sustainability initiatives, the total population of eight lecturers within the Faculty of Business Administration underwent training. Twenty students from a population of 130 were conveniently sampled and used in this TSSIP initiative. Convenience sampling was adequate because the faculty could not access the entire target population during the activity. Seven students from the group of twenty completed an open-ended survey that was used to capture their feelings and emotions relating to the HEI in fostering a culture of engagement and awareness in the SDGs.

10.2. Data Collection Methods

Data was collected using document reviews and open-ended surveys. The document review process entailed reviewing documents completed by student work groups during the TSSIP workshops. The simple problem tree, empathy map, the design thinking toolbox, the brainstorming toolbox, and the project formulation toolbox were reviewed. The researchers also reviewed the final report that was completed on the sustainability initiative students believed would solve the issues within their society.

10.3. Procedure (The Student Initiative Project)

Students were required to conceptualize a sustainable initiative that addresses an issue hindering the sustainable development of their institution or the wider society. This was done through three design thinking seminars conducted by a team leader and group mentors. A people-centered design thinking approach was used, where students were asked to use a three-step approach to solving a problem.

10.3.1. Seminar 1: Sustainable Development Talk and Design Thinking Seminar

This seminar was conducted with fifteen students and four lecturers from one of the island campuses, as well as five students and four lecturers from the main campus. Students were asked various questions about how much they knew about the United Nations Sustainable Development Goals and sustainability. A thirty-minute presentation was then conducted by the team leader on the 17 SDGs in general. Based on students' understanding of the SDGs, they were asked to form teams comprising four students. Each team would then be guided through step 1 of the design thinking process of "Problematization." In this step, students within their respective teams were asked to (1) identify an issue they believe poses a threat to the sustainable development of the TCI, (2) determine who the problem affects, and (3) explain why solving the problem is necessary. This step would be documented on a broadsheet.

10.3.2. Seminar 2: Online Data Analysis Seminar

This seminar gave an overview of the various research methodologies and designs, data collection methods, and data analysis techniques.

10.3.3. Seminar 3: Design Thinking Seminar

This seminar aimed to complete steps 2 (Empathize, Define, and Ideate) and 3 (Prototype) of the people-centred design thinking approach. In step 2, students were asked to (1) conduct a simple survey with the intended target audience for their project, (2) analyze the data collected to determine and understand how the target audience feels about the problem, (3) brainstorm as a team and conceptualize solutions for the problem, and (4) identify the best option to formulate. In step 3, students were asked to (1) determine the exact course of action to be carried out and three specific goals for accomplishing this; (2) identify the resources and alliance needed to ensure the success of the initiative proposed; and (3) identify the intended impact the initiative should have in solving the problem.

10.4. Procedure (Qualitative Survey)

Data was collected using a self-administered qualitative survey containing ten open-ended questions designed to answer research questions 1 to 3. The thirty-minute survey was administered using Google Forms. The link was e-mailed to all participants. Students were asked to sign a consent form before commencing the survey.

10.5. Data Analysis

Data was analyzed using descriptive statistics and content analysis. Content analysis was used because the researchers wanted to develop themes to get a better understanding of student's awareness of the SDGs and sustainability. The researchers used a type of content analysis called conceptual analysis, which allows for the determination of the existence of textual data that represents commonalities among students' responses. Data was collected, cleansed, and coded. Labels were assigned to words and phrases that represented common themes.

11. Results

11.1. Demographic Characteristics

The study participants comprised six females (30%) and fourteen males (70%) from both campuses between the ages of 18 - and 22. Four students (20%) were based on the main campus, while sixteen students (80%) were from the West Campus. Eleven students (55%) were enrolled in the Faculty of Business Administration, four students (20%) were enrolled in the Faculty of Computer, Engineering, and Mathematics, three students (15%) from the Faculty of Hospitality and Tourism Management, and two students (10%) from the Faculty of Technical and Vocational Education. All students were full-time students and were enrolled in an associate of art or associate of science degree within their faculties.

11.2. Research Question 1: How Can HEI Increase the Awareness of SDGs Across Campuses?

All twenty participants of the student sustainable development initiative program were asked if they were aware of the United Nations Sustainable Development Goals (SDGs). All participants indicated that they were not aware.

The participants were asked if they were aware of the meaning of sustainable development. Similar meanings were conveyed. Participant 1 stated, *"Sustainable development is the process of meeting the needs of the current and future citizens of the country."* Participant 2 stated, *"Sustainable development was meeting the needs of the present citizens without compromising the needs of the future generations."*

Students were asked if there were any sustainable development practices carried out by their institution and country. Participant 3 stated, *"My community is involved in sustainable waste disposal, sustainable tourism, and sustainable financing as Country X is known for offshore banking."*

Seven students completed the open-ended survey and were asked how institutions could foster engagement. Three themes emerged from coding the data: one related to creating a participatory culture, engaging in student-led projects, and providing financial assistance. By creating a participatory culture, the respondents stated that the institution should "create a culture that encourages students to actively engage in learning; institutions can foster a sense of ownership and commitment to their education." A participatory culture could see the institution hosting clubs and social events, Participants stated that "The college can start at the level of the students by teaching sustainable development as a course or as a part of a course." By engaging in projects, the institution should encourage "students to be planners of sustainable activities and projects similar to the TSSIP project." Respondent #4 stated that "the institution can put on projects, sensitization sessions, seminars, etc., or include it as a course to teach in class." The participants agreed that the institution could provide the students with "funds to start a project or initiative such as recycling.

Survey question number five asked in what ways the institution can assist in bringing awareness to students on the sustainable development goals (SDGs). The common theme associated with student responses relates to

the promotion through various marketing tools, talks, and discussions. Regarding the promotion using various marketing tools, respondent #4 stated, "The institution can hold seminars, give brochures, put stuff about SDGs on the notice boards and have SDG competitions to raise awareness." Respondent #5 stated that awareness can be raised through "billboards, e-mails, web pages, social media correspondences." One student stated that talks and discussions can be done "during principal's hour or in classes." Respondents further reiterated that awareness can be brought "by incorporating the SDGs into the school curriculum and offering extracurricular activities related to sustainable development, institutions can help students understand the SDGs and how they apply to real-world situations" (Respondent #3).

11.3. Research Question 2: What Initiatives Can be Implemented by HEI to Best Engage Students in the Engagement of the SDGs Using a Design Thinking Model?

Participants were asked how a step-by-step approach was used to formulate SDG projects. The coded data revealed two recurring themes. The first theme is the guidance that a step-by-step approach will provide to students in executing the project in the right direction. The second theme is how the step-by-step approach will lead to efficient performance. Participants stated that the step-by-step approach is needed to "help formulate, develop, and execute the projects" (Participant #6). Other respondents were not sure how the step-by-step approach would help in the formulation of sustainable development projects; however, they believe that specific and SMART (specific, measurable, achievable, relevant, and time-bound) goals are set for the project, then they should be used to solve the problems that exist.

Students were asked what measures the institution could implement to assist them in identifying sustainable development problems. The emerging themes were creating a culture of dialogue, providing financial assistance, and having recurring sessions. Students stated that in creating a culture of open dialogue, leaders of the institution should be open-minded, aware of every changing problem within society, and listen to complaints and suggestions, which will assist in solving problems. One participant stated, "By creating a culture of open dialogue, the institution should encourage students to share their opinions and raise issues that are important to them" (Participant #2). Other students believed that the institution could conduct brainstorming activities and games and engage in discussions through clubs and societies, rap sessions, and focus group discussions. Students believe that the institution could provide financial assistance by "give us the students money to carry out a sustainable project such as recycling within the college."

11.4. Students Initiative Projects to Raise Sustainable Development Awareness

To raise campus awareness of the SDGs, students were introduced to a design thinking workshop. In the workshop, students worked in groups of four on sustainable development-related issues within their college or country.

Table I shows the sustainable development problems and possible solutions as identified by students during the design thinking workshop. Members of the Faculty of Business Administration and TSSIP coordinators were actively involved in cross-campus workshops. Faculty members were assigned to a group to guide students throughout the process. Facilitators engaged students through workshops to familiarize them with the 17 sustainable development goals. The facilitators used real-world examples to allow students to envision the current problems and possible contributions they can make to finding solutions and achieving goals.

11.5. The Winning Project

The project entitled "The renewable energy industry: A step towards diversifying Country X economy to alleviate an over-dependency on the tourism industry" was the most successfully designed project that brought about awareness of sustainable development. The project highlighted the following:

11.5.1. The Problem

The over-dependency solely on the tourist industry. This indicates that most jobs and revenue come from within this industry. The problem lies in how the country would sustain itself in the event of a crash within the industry, which we were given a glimpse of during the spike of the COVID-19 pandemic.

11.5.2. Target Audience

The target audience of this project is the Government, persons employed in the Tourism industry, and residents of Country X.

11.5.3. The Sustainable Solution to the Problem

The students believed that:

"A renewable energy industry that focuses on solar and wind energy would majorly benefit the country. This industry would provide a new form of clean energy, which would decrease our fuel consumption rate, reduce pollution, encourage responsible consumption, and offer a new form of revenue, new job opportunities, and training that can introduce new skill sets. This will reduce the overdependence on the tourist industry as the country's major revenue source."

11.5.4. Task Plan to Achieve the Solution

A nine-step process was devised:

1) Conduct an environmental survey to determine the most suitable place for implementing renewable energy projects,
2) Seek permits needed for this industry's operation would have to be applied for and paid for,
3) Conduct meetings with the stakeholder groups to determine the agreed-upon terms,
4) Engineering consultations and meetings should be held,
5) Source equipment and parts,
6) Begin construction when the materials have arrived,

TABLE I: Sustainable Development Problems and Possible Identified by Students in the Design Thinking Workshop

Sustainable development problems	Solutions identified
Garbage disposal	• Build recycling facilities • Provide education on proper garbage disposal • Place garbage receptacles in various communities and areas within the college • Frequent collection of garbage by the state/college
Internet connectivity	• Increase bandwidth • Provide internet in all the classrooms and public spaces
Juvenile delinquency	• Build rehabilitation centers • Counselling sessions by youth groups for delinquents. • Youth apprenticeship programs
Over-dependence on the tourism industry	• Create alternative sustainable sources of revenue generation, such as renewable energy.
Agriculture	• Creating sustainable agricultural practices within the TCI.

7) Perform health and safety inspections will have to be done to ensure all requirements for a safe and healthy work environment are met,
8) Conduct employee recruitment and training can be done,
9) Begin operations.

11.6. Research Question 3. How Can Industry Players Partner with HEIs to Foster a Culture of Sustainability among Students and the Public at Large?

Research Question 3 asked the student participants to share how HEIs can partner with industry players to create a culture of sustainability in all sectors of the economy. All participants agreed that industry players could play an active role in promoting sustainable development goals. They believe that the guiding principles of what the goals represent should be practised and replicated in business events and functions. Each business has a part to play by providing sustainable products and services to consumers. This may be a result of providing products that use sustainable materials, thus reducing waste and minimizing the negative impact on the environment. The provision of funding and the promotion of college sustainable development were common themes emerging from coding the data. One participant strongly articulated their belief that the "business community can provide education on the SDG and provide funding to the college to assist in its education on SDG." Participant #7 stated that the industry players can "give funding and a platform to carry out projects."

The participants believed that the college's role is to appeal to students and educate them about the benefits of the SDGs and how active engagement with SDGs may affect their livelihood. Students believed that "social media is a great tool to bring these ideas to fruition."

12. Discussion

The main research question sought to determine how higher education institutions may be able to develop a culture of sustainable development that fosters students' awareness and engagement through problem identification and problem-solving. The answer to this question lies in the leadership buy-in and students' involvement and engagement in sustainable practices. The limited understanding of sustainable development and sustainable development goals is indicative of the fact that sustainability should be incorporated into the curriculum and program structure of any institution. This not only raises students' level of awareness but fosters engagement and practice.

The study conceptualizes students' understanding of sustainable development as a process of meeting societal needs without compromising the future. Institutions and the country must be cognizant of the sustainability issues which may compromise their ability to function properly. Problems such as garbage disposal, tourism sustainability, and renewable energy were identified in the problematized stage of the design-thinking approach. The empathize, define, and ideate stages involved students brainstorming, conducting surveys, and analyzing data to solve societal and institutional problems. Active participation in the design thinking process proved to be an ideal set of strategies to increase students' awareness and engagement. The study's findings align with Barth and Rieckmann (2012), who call for higher educational institutions to engage students in participatory approaches rather than

the traditional means of teaching students about sustainable development.

Higher educational institutions can implement various initiatives to engage students using a design thinking model. The institutions must first institute sustainable development and the SDGs as part of their culture, including it in their curriculum. This supports the work of authors such as Kioupi and Voulvoulis (2020), who advocate for sustainable development goals and sustainable development to be integrated into the institution's learning objectives and program. Higher educational institutions have a role to play as knowledge disseminators, behaviour consolidators, and idea innovators, which support the design-thinking initiatives conceptualized by the faculty (Leal Filho, 2018).

Ray (2012) and Glen *et al*. (2014) deemed the design thinking methodology, which was selected as the tool to use for T-SSIP, as an evolved means for processing data that considers people and their feedback through communication, critical thinking and creativity. The tool incorporates the specific and SMART goals that respondents found to be the best means for solving existing societal problems. The methodology proved to be an effective tool for formulating the various sustainable development projects developed by the students. As stated by Kijima *et al*. (2021), the methodology allows students to work in multidisciplinary teams, which was evident in a couple of the teams, which comprised students from different faculties. This would have helped to overcome the lack of good ideas challenge discussed by Linton and Klinton (2019), as the groups were able to view the problem from a different lens and the lack of creativity issue talked of by Clark *et al*. (2020) as the multidisciplinary composition of the groups enhanced the creativity and innovativeness of the solutions put forward by those groups.

The uncertainty of students, as described by Panke (2019), when first interacting with the methodology, was alluded to by the respondents when they stated that they were unsure how a step-by-step approach could assist them in formulating their projects. To conquer this concern, the facilitators of the design thinking methodology did ensure that materials were prepared beforehand and that the educators to be paired with student groups were trained; two areas discussed in the literature as hindrances to the effective use of the methodology and thus the devising of sound creative ideas (Anastasiadis *et al*., 2020; Clark *et al*., 2020; Panke, 2019; Retna, 2016; Tseng *et al*., 2019). The approach guided the students in identifying issues that affected their communities and steered them to develop 'people-centered', innovative and creative solutions. This corroborates conclusions of Ambrose and Harris (2010) and Plattner *et al*. (2015) on the methodology as a progressive tool for the 21st century in education.

Research question three sought answers to the possibility of forming a relationship between the institution and the industry players to foster a culture of sustainability among students and the community the institution serves. Industry players can begin to create this culture of sustainability by engaging in products and materials that reduce waste and mitigate negative effects on the environment. Olawumi and Chan (2018) spoke about sustainability having to do with the environment and the involvement of all stakeholders in the process and promoting a sustainable environment in HEIs. However, a relatively new phenomenon (Blasco *et al*., 2020) can go a long way in creating a culture of sustainable objectives. Further assistance from the industry or community through project funding can also encourage the culture of sustainability. Entrenching their commitment to institutions by promoting and funding their projects will aid in students' involvement and education of SDGs. Studies have encouraged the introduction of Education for Sustainable Development (ESd) in HEIs to influence policies and increase awareness of SDGs (Leicht *et al*., 2018; Thomas, 2016). Continuous awareness and practice of SDGs within the HEIs will create a nation of thinkers that transfer their knowledge into the wider community.

It is incumbent upon the institution to provide students with the tools they need to function, change, and sustain the environment in which they operate. The call for HEIs to go beyond their traditional techniques and teaching methods to include sustainability (Barth & Rieckmann, 2012) allows students to transfer their learning and become advents for change within the industry. Actively involving industry players through sponsorship and mentorship for students creates a culture of involvement of all stakeholders towards similar goals that will benefit the students and the community. Students are future leaders, and involving them in promoting SDGs will guide them in making the right decisions for sustainability within their institution and the environment. This partnership will drive research and innovation in areas underutilized for sustainable development and promises sustainable growth.

13. Recommendations

For the future of sustainability, the institutions should:

1) Introduce short courses for students to matriculate from their programs.
2) A professional development session for staff and HEI leaders.
3) Provide short courses for the business community on sustainable development goals and sustainable development.

14. Recommendation for Future Research

Future research could include faculty and administration actively participating in the design-thinking process. The student advisors could play a more participatory role as action researchers. Their close involvement and participation in the research process could further help solve existing sustainability problems and present solutions that may benefit the present and future generations. Future research should include the prototype and testing phase of the design-thinking process, allowing students to determine the course of action, intended impact, and resource allocation necessary to solve sustainability issues.

The business community should be engaged to assist with the prototype and testing phase.

15. Conclusion

This study has concluded that students are not fully aware of sustainability goals and sustainable development in general. Students' involvement in the design thinking workshop and planning their sustainability development project helped raise their awareness and engagement levels. Students who participated in the sustainable development initiative could be a rectitude of strength for their institutions and communities by transferring knowledge and making sustainability their number one priority. Partnerships between the industry and HEIs through the mentorship and sponsorship of SDG projects and initiatives can create a culture of sustainable development. This culture will extend to future research and planning that will filter into society as solutions are uncovered and recommendations are made to aid community development. This ingrained culture will set the foundation for future students in the institution.

Conflict of Interest

The authors declare that there are no conflicts of interest associated with this research.

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