*Article*

# Teacher Views on Teaching Sustainability in Higher Education Institutes in Australia

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**Abstract:** Higher education for sustainable development (HESD) plays a key role in achieving the United Nations' 17 Sustainable Development Goals (SDGs). This research study specifically examined HESD in terms of eLearning initiatives in Australian private higher education providers from the perspective of teachers. A qualitative structured interview method was adopted wherein 10 teachers were interviewed in order to gain an understanding of their general knowledge of HESD, their attitudes and experience towards HESD, their teaching practices related to HESD, and their understandings of strategy as well as planning initiatives for their institution. The main findings suggest that (1) teachers in private higher education providers tend to have a limited knowledge of sustainability concepts and limited experience in teaching sustainability; (2) eLearning can be a valuable approach in teaching sustainability, but this approach presents teachers with challenges such as student engagement; and (3) private higher education providers require proper resources and governance frameworks in order for any sustainability initiative to be successful. This research highlights the resourcing aspect of private higher education providers in training staff, developing learning materials, and developing practical guidelines to achieve the SDGs by 2030.

**Keywords:** sustainable education; higher education; sustainable development goals; teacher perspectives; grounded theory; eLearning

## 1. Introduction

The efforts of understating, promoting, planning, and enacting strategies for sustainability in teaching, research, and campus operations have been garnering increasing attention from higher education providers internationally. Sustainability refers to the capability of a system to maintain a certain level across time. This concept has three main focuses—social, economic, and environmental—which gradually emerge from various theoretical discussions [1]. Specifically, higher education for sustainable development (HESD) is an educational approach that enables learners with the appropriate knowledge and skill set to address global sustainability challenges. The aim of HESD is to advance the knowledge of students, teachers, educational institutions, and communities so that they can collectively act on sustainability issues and to be able to critically think, innovate, and provide solutions to complex sustainability issues. There are myriad strategies for introducing sustainability in education around the world, e.g., the Education for Sustainability project funded by the Australian Government Department of Education and Training (https://sustainabilityinschools.edu.au, accessed on 10 March 2022). The Sustainable Development Goals (SDGs), announced in September 2015 by the UN General Assembly session, comprise 17 goals that are designed [2] to transform the world into a better place by meeting basic needs in developing nations (e.g., health, education, etc.) and achieving global partnership goals (e.g., global partnerships for science, technology, and

innovation). The Envision2030 agenda presents a holistic approach to achieving sustainable development in various aspects of life, e.g., quality education and sustainable cities and communities by 2030. The higher education sector plays an important role in addressing global challenges for sustainable development and can promote sustainability through education and by developing sustainable societies/communities, e.g., developing advanced knowledge, skills acquisition, sharing experiences, peer-to-peer collaborations, and sharing good practices and values. Consequently, through developing an understanding of teaching sustainability in higher education, we can improve the range of services offered, and we can develop strategies to address other educational, economic, social, environmental, and cultural needs.

Academics play an important role in advocating for the principles that underpin HESD [3,4] through their teaching and learning processes, and through achieving the goals and objectives of educational institutes to address real-world problems. Academics take on a range of roles and responsibilities within educational institutions, e.g., teaching, research, leadership, and mentoring, which are vital in the development of their students' ability to think critically about global issues and to prepare their students for the responsibilities of their chosen profession. Hence, there are many ways that an academic can use their approaches to teaching and research to promote and achieve sustainable development; such as, but not limited to, creating collaborative learning environments, self-learning educational ecologies, assessments for gaining knowledge and skills, collaboration with relevant industries for research and development, and interactive sessions. There is still much to learn in this area in terms of good practice in sustainable education. In particular, there are still a number of critical concerns that remain unanswered when we evaluate these practices in a distance electronic learning (eLearning) context. Recently, the post COVID-19 pandemic educational landscape has seen an increase in interest in sustainability in higher educational institutions in terms of teaching, students' personal and professional skills development, and international mobility. However, what is missing is a clear understanding of teachers' (academics') knowledge and experience of teaching sustainability in online environments.

A number of factors have an impact upon the quality of eLearning initiatives and students' learning outcomes. Private institutions, generally because of limited access to resources, such as government funding, and the potential limitations of essential infrastructure, are faced with their own unique challenges when it comes to implementing sustainability in education and in eLearning in particular. Private providers may face challenges, such as inadequate equipment and infrastructure for online teaching, poor platforms to support inadequate training to teachers (both personal/professional and for use of online ICT equipment and software), poor training for students (especially for practical courses), limited student−teacher interactions, and internet access issues during peak hours [5]. These factors may result in poor teaching quality and negative effects on student learning outcomes. To enhance the quality of eLearning initiatives, many emerging information technologies have been adopted in the online learning environment, for example, gamification. Gamification refers to the practice of designing and embedding gamed-based learning activities such as online quizzes in teaching delivery. The literature has evidenced the positive effect of gamification on eLearning outcomes, but also argues that gamification is a young field which requires further empirical investigations [6].

Private institutions can still perform an important role in sustainable development. As the number of private institutions has increased over the past decade, they have increased their visibility on the educational landscape in terms of driving policy and legislation changes [5]. The authors in [7] have put forward several factors that can differentiate private higher education institutions from public universities, including but not limited to institutional governance, strategic planning and resourcing, and research culture. The authors in [8] suggested that these factors could inspire private institutions to actively participate in sustainable development initiatives, and, consequently, it is important to assess the contributions of private institutions for sustainable development.

Our aim, in writing this paper, was to understand the degree of engagement and commitment of an Australian private education provider towards sustainable development in its teaching, research, and skills, and the personal and professional development of both students and the teaching staff. We sought to investigate the level of attainment of this provider regarding sustainable development and how it evolved to bring sustainability within the campus operations and institutional philosophy. For this reason, we undertook structured interviews with ten teachers working at the private provider.

There is a substantial body of research that documents the role of sustainability in higher education, such as [9,10], which focus on curriculum development, teaching and learning outcomes, and teaching and research. The authors in [11,12] investigate various initiatives of higher education institutions for sustainable development. Similarly, authors in [11] discuss regional-specific sustainability challenges. There are other studies that examine the importance of sustainable eLearning for both students and teachers [13], and another study [14] investigated the effect of online education on the written and verbal communication skills of students. Another line of research has focused on the successful transition from conventional face-to-face learning to eLearning [15]. Findings from this line of research suggest (see [16], for example) that there were no significant differences in student performance between face-to-face and online education groups. Research suggests that there has been an increased number of private institutions that are taking part in sustainable development initiatives [5,7]. However, to the best of our knowledge, there are no studies to date that have explored the practices of sustainable development in private higher education providers in Australia.

Our main contributions are given below:

1. To determine the awareness among teachers about sustainability and Sustainable Development Goals (SDGs) defined by the UN.
2. To discuss the experience of teachers in teaching sustainability online in private academic institutes in Australia.
3. To determine the challenges faced by teachers in teaching sustainability online in private academic institutes in Australia.
4. To discuss solutions to overcome various challenges in teaching sustainability online in private academic institutes in Australia.
5. To find out how teachers incorporate sustainability in their online lectures.
6. To find out how private institutes can help teachers to effectively teach sustainability online.

The rest of this paper is organized as follows. In Section 2, we present the related work. In Section 3, we explain the research methodology that is used in this study. Results and discussion are presented in Section 4. Finally, the paper is concluded in Section 5.

## 2. Related Work

We reviewed existing literature but found no current study investigating teachers' views on teaching sustainability in Australian private higher education institutions. Therefore, in this section, we discuss various works related to our research topics, establishing the theoretical foundations of this study. We at first discuss the current conceptualization of sustainable education, which is the core research context of this study. We then summarize the key research findings regarding the roles of eLearning, private higher education providers, and teacher perspectives in sustainable education.

### 2.1. Sustainable Education

The definitions of sustainable education are varied in the current literature. As such, it is difficult to put forward a single shared definition. However, when discussing sustainable education, prior studies hold two main perspectives about the underlying concepts that frame sustainable education. From one perspective, studies investigate the sustainability of education itself. In these studies, education is viewed as a process that needs continuation without disruptions. This group of research mainly aims to uncover the essential factors

impacting education outcomes. It focuses on the sustainability of education during the transition of education approach. For example, COVID-19 has forced many institutions to fully adopt online teaching instead of conventional face-to-face teaching [17]. Many institutions suffered during the process, and substantial studies have discussed the obstacles to online teaching during the transition [14,15].

Another stream of research has investigated how education can contribute to the sustainability development goals defined by the United Nations. Education is one of the main communication vehicles to inform the notions of sustainability and can help students establish the sustainability skills to be eligible future citizens [18]. Education can also arm students with essential skills and abilities to contribute to sustainable development. For example, education can increase student skills in system thinking, which emphasizes thinking thoroughly within a system. As sustainability integrates three equal dimensions, environmental, social, and economic, system thinking can be the key to promote a holistic approach to problem analysis [18]. Specifically, sustainable education can directly contribute to SDG4, and can indirectly contribute to other SDGs.

### 2.2. Sustainable Education and eLearning

With the development of technologies, many institutions have started to adopt an eLearning approach to teaching. The recent COVID pandemic hastened this move towards technology supported learning [17]. eLearning has become a critical component of sustainable education and it has received wide research interest.

According to the two perspectives in understanding sustainable education, prior studies have examined how eLearning can be sustainable as well as how eLearning can contribute to sustainable development. In the first stream of research, existing studies have identified several key elements related to sustainable eLearning. At the onset, the importance of eLearning has been recognized by both students and teachers [13]. However, researchers have found that the effectiveness of the eLearning education approach is questionable; thus, it is critical to understand essential factors affecting the sustainability of the eLearning education approach. For example, ref. [14] evidences the positive effects of the integration of online communication platforms on the formation and development of written communication skills. However, ref. [15] finds the transition from traditional face-to-face education to eLearning has tended to be unsuccessful in Algerian higher education institutions. Additionally, in the context of maths education, although class grades do not differ between eLearning (during the COVID-19 pandemic) and face-to-face learning (before pandemic), there do exist some difference between student test and homework performance in the two teaching modes [16].

In the attempt to identify elements critical to the sustainability of the eLearning approach, prior studies have generated a range of findings. Generally, it has been evidenced that the use of technologies in promoting synchronous communication can increase the effectiveness of education programs and, consequently, can have a positive impact on student satisfaction [19]. Regarding the specific factors that can impact the sustainability of eLearning, prior studies have presented findings from several perspectives. From the perspective of students, a lack of student motivation and a lack of peer interaction can affect student attitude towards eLearning, which may, in turn, decrease the outcomes of eLearning and deteriorate the sustainability of this education approach [15,19]. Moreover, teachers may play a critical role in the sustainability of eLearning as well. As eLearning needs to use the vehicle of ICT technologies, teachers need to acquire relevant skills in mastering these technologies during content delivery. Therefore, a lack of relevant skills or lack of proper knowledge of the use of technology to support learning may have a significant adverse effect on education, which can further impact the sustainability of eLearning [15,20,21]. How teachers deliver content can also be critical to the sustainability of eLearning. For instance, ref. [22] suggests that, during the transition from face-to-face teaching mode to eLearning, there is a general need for teacher training on embedding life skills into teaching. A third important aspect is the content being delivered in eLearning.

For example, ref. [13] finds that Austrian students acknowledge the high importance of digital learning, but they are skeptical about online course formats and digitalization of teaching and prefer the interactive classroom experience. The authors of [20] find that course design can have a tangible impact on students' attitudes towards eLearning in Hong Kong. The final aspect is from the contextual settings. Infrastructure, such as access to the internet and hardware/software equipment, and online teaching culture have also been found to be influential in the sustainability of eLearning.

In the second stream of research, existing studies have examined how eLearning can contribute to sustainable development goals defined by the United Nations. Researchers have argued that eLearning can provide education access to students from a variety of backgrounds, allowing for vast dissemination of education and educational equality. In addition, eLearning enables remote teaching and, thus, can lower the consumption of carbon density resulting from commutation and campus operation [19]. Specifically, refs. [21–23] argue that eLearning using some online platforms such as MOOCs can help promote human rights and democratic values, thus contributing to SDGs. The authors of [24] also find teacher presence plays a critical role in using gamification to teach sustainability knowledge with eLearning.

### 2.3. Sustainable Education and Private Higher Education Institutions

Higher education has an important role to play in sustainable development. There is a large body of literature investigating higher education for sustainable development [12]. The focused research topics include curriculum development, teaching and learning outcomes, organizational change/learning, students'/lecturers' views and opinions, development of education for sustainable development in higher education in a particular nation/region, assessing students' learning outcomes, and philosophy and research in HESD [9]. The authors of [10] have summarized that higher education can contribute to sustainable development in five aspects: teaching and learning, research, campus operation, outreach, and administration. Similarly, ref. [11] identified six categories of higher education initiatives for sustainable development: basic premises, teaching, research, outreach, campus operation, and communication. It also summarized four guidelines for higher education for sustainable development as life-long learning, ethics, and transparency, holistic approach to develop critical thinking, sense of responsibility, and awareness, as well as inter- and multidisciplinary approaches. Regarding the driving forces for higher education in contributing to sustainable development, the literature has identified five critical issues including regional-specific dominant sustainability challenges, financing structure, and independence, institutional organization, the extent of democratic processes, and communication and interaction with society [8].

Prior studies in this area have explicitly set the research context in public universities, or implicitly if they refer to higher education institutions in general. The research community lacks a clear understandings of how private education institutions can contribute to sustainable development. Private higher education institutions are also becoming more prevalent in tertiary teaching and are becoming more legitimate in terms of a quality learning experience and educational outcomes. For example, ref. [5] has shown that with the increase in the number of private higher education institutions, they now exceed the number of public higher education institutions. This has been an ongoing trend since the late 1990s and, since 2000, more than 60% of new higher education institutions are founded privately. According to the Australian Department of Education, Skills, and Employment, the number of Australian commencing students enrolling in private universities and non-university higher education institutions has reached 16.7% of the total number of enrollments. Regarding sustainable education, public universities and private higher education institutions may have different focuses. The authors of [7] have suggested several factors that distinguish private higher education providers from public universities, including institutional governance, strategic planning and resourcing, staffing, research culture, and student admission. These factors are highly relevant in the identification of

the driving forces of sustainable development in the existing literature [8]. Therefore, it is valuable as well as necessary to uncover how private education institutions can contribute to sustainable development.

*2.4. Sustainable Education and Teacher Perspective*

In investigating sustainable education, gaining an insight into the perspectives of teachers can be both useful and valuable. As teachers are the driving forces in education, teachers' knowledge and opinions on sustainable development, their practice in designing and delivering relevant learning materials, as well as their insights into challenges and required support can be critical determinants to developing a successful sustainable education strategy. In general, the literature has reported consistent findings that teachers are aware of environmental problems and have a high level of disposition towards sustainable education [25–27]. In particular, teachers' attitudes towards sustainable development have significantly increased since 2007 [27] and were higher still in 2019. Teachers' attitudes to sustainable education tend to focus on system thinking and citizen participation [28].

Regarding how teachers can contribute to sustainable development, ref. [29] has suggested several essential factors including involvement of the teaching staff, personal motivation, good leadership, and support of the school. The authors of [29] have also shown that the stability of staff and identifying with the project play decisive roles in sustainable education. Another important finding is that experiential activities, activities outside the classroom, and a positive perspective on the subject can be determinants of the success of the program.

In terms of the perspectives of different groups of teachers, ref. [25] has found that male teachers tend to have a more favorable attitude towards sustainable education than female teachers while [8,30] have investigated the difference between experienced teachers and novice teachers. Although these two groups of teachers demonstrate some differences in education outcome and competence, they do not demonstrate any difference in identifying difficulties. From another angle, some other studies have examined the difference between pre-service teachers (i.e., current students who will be future teachers) as well as incumbent teachers [31]. It has been found that pre-service teachers may have more theoretical knowledge on sustainable education than incumbent teachers, while the latter can have more practical knowledge.

The literature has also identified several key problems in sustainable development from a teacher's perspective. First, many studies have suggested that most teachers lack the necessary training to fulfill the job requirements in sustainable education [32,33]. Although teachers have demonstrated a good appreciation of sustainable education and sustainable development, they face difficulties in the actual delivery of sustainability learning materials. For example, they may lack a proper theoretical and technical knowledge to teach sustainability. A corresponding research stream for this problem investigates the design of teacher education programs, to better prepare students to be future teachers for sustainable education [34]. However, such discussions tend to focus on primary and secondary school teachers, and these discussions are disconnected from the higher education context. Second, the COVID-19 pandemic has transformed face-to-face education into an online mode. Many teachers face challenges and are stressed out during the COVID-19 transition [35,36]. They need substantial support from schools to retain the sustainability of education, such as training on the use of ICT communication tools. Further, the literature suggests that the current sustainable education guidelines tend to be abstract and less practical. Teachers seek concrete support and specific instructions instead of abstract policies to contribute to sustainable education.

## 3. Research Methodology

This section presents the methodology used in this study in detail. This study was designed using a structured interview instrument and qualitative analysis to understand teachers' opinions on teaching sustainability. The interview schedule comprised 18 ques-

tions and was divided into four question sets: 'general knowledge', 'attitude and experience', 'practice', and 'strategy and planning'. The interview questions were designed to gain an understanding of the participants' understanding of sustainable development. We wanted to explore their awareness about sustainability in education, in particular, the challenges of teaching the sustainability in online education and the use of technological tools and techniques in teaching sustainability. We also wanted to gain insights into the practices that participants undertook to incorporate learning material related to sustainability in their class and the students' engagement with those materials. As part of this investigation into learning and teaching practices, we hoped to find examples of how sustainability was assessed. Finally, as part of the final question set in the interviews, we wanted to gain an understanding of their views on the commitment and support needed by management to introduce sustainability in online classes.

### 3.1. Research Approach

This study is firmly grounded in a qualitative research paradigm. Qualitative methods are used to understand people's beliefs, experiences, attitudes, behaviors, and interactions [37]. Qualitative research gives the participant the opportunity to share their experiences and provides the research team with insights into the lived experience of the participants. This rich form of data may not otherwise be available through a purely empirical form of data collection.

The broad research approach can be considered as the plan or proposal to conduct research that involves the intersection of philosophy, research designs, and specific methods [38]. Once the philosophical worldview assumptions are set by the researchers, a related research design to the worldview is chosen, and specific methods or procedures are applied to translate the approach into practice. The research approach in the study was determined after carefully evaluating these three components.

Philosophical worldviews are essential to identify as they influence the practice of the research [38] yet remain largely hidden [39]. There are four worldviews that are commonly highlighted in the literature: (1) postpositivism, (2) constructivism, (3) transformative, and (4) pragmatism. Among the four philosophical worldviews, for this study, the constructivist worldview was chosen because the goal of this research was to rely on the participants' views, and it is an approach to qualitative research [38]. The questions used in this research were broad and general, enabling the participants to construct the meaning of the situation. The inclusion of more open-ended questions can allow researchers to listen actively to what the participants say or do in their real world. To achieve the goals of this study, open-ended questions played an important role. Regarding the three other worldviews, after analyzing the pragmatic worldview, we concluded that it was not suitable for this study as the postpositivist worldview was considered as the scientific method and most of the assumptions in this research were applicable to quantitative research. In the pragmatic worldview, research is problem-centered, real-world practice-oriented and focuses on consequences of actions, and so not aligned with the philosophy of this study. Lastly, the transformative worldview aims to change the participants' lives through an action agenda, which was not suitable for this study.

The second element in the research approach is research designs, also known as strategies of inquiry, which provide specific guidance for procedures within the types of inquiry among qualitative, quantitative, and mixed-method approaches. The qualitative design is focused on answering the whys and hows by exploring and understanding the meaning of individuals or groups. On the other hand, the quantitative research design mainly involves true and less rigorous experiments. Under this design, among all the approaches, survey and experimental research are the two most popular approaches. Lastly, mixed-methods designs combine or integrate both qualitative and quantitative research designs. For this study, among the various approaches under the qualitative designs, grounded theory design was deemed appropriate as it can be used to derive a general, abstract theory based on the participants' views.

The third and last element in the research approach is the research methods that establish the characteristics of data collection, analysis, and interpretation proposed by the researchers. It was established earlier in the philosophical worldview that open-ended questions are a great choice to capture the views of the participants. Later, in research design, it was established that grounded theory design is the appropriate quantitative design for this research. Therefore, this study involved open-ended questions and interview data as qualitative methods.

### 3.2. Interview Design

This study used structured interviews. This is consistent with the qualitative paradigm as interviews are the most common format of data collection in qualitative research. The authors of [40] propose that the qualitative interview provides a rigorous framework through which practices and standards are not only recorded, but also achieved, challenged, and reinforced. The use of interviews was deemed appropriate as we were seeking to understand the practices and understandings of teachers of sustainability in education.

#### Interview Approval, Testing, and Recruitment

Ethics approval for the research was obtained from the respective institute's ethics committee before conducting the study. After determining the interview questions initially, a pilot study was conducted to refine the question flow and wording.

The target audience for this study was the academics in the private institutes in Australia. Academics from different levels (lecturer, senior lecturer, assistant professor, etc.) were directly invited to participate in this study based on their professional network. For the purpose of the study, it was ensured that the participants had teaching experience with private institutes for at least two years. However, no specific selection criteria were used for institutes as the focus of the study was academics. Along with the invitation, a participant information sheet and consent form were provided. In total, ten academics participated in the interviews. Among the participants, nine (90%) had IT and one (10%) had a finance background. In terms of education level, all the participants had at least a master's level degree in their area of expertise; and five (50%) had a Ph.D. degree in their respective fields. There were four females and six males in the study. Gender differences were not discussed in this paper, and this information is for context. The participants were numbered from one to 10.

### 3.3. Data Cleansing and Analysis Procedure

This study used a grounded theory approach in the analysis of the qualitative data. Grounded theory was put forward as a legitimate means of analysis by Glaser and Strauss, who are recognized as the founders of grounded theory [41,42]. Grounded theory represents both a method of inquiry and a resultant product of that inquiry. It has been noted that while grounded theory studies may commence with a variety of sampling techniques, many, as in the case of this study, do commence with purposive sampling. In a grounded theory study, the process of collecting and coding data is undertaken in conjunction with constant comparative analysis, purposeful sampling, and the writing of notes [43]. This was deemed relevant to our study as the process of coding and re-coding the data was done via an ongoing conversation between two members of the research team. The ongoing nature of the conversations meant that there was a refinement both of the analysis of the interview transcripts and of the coding system. Natural markers of speech, such as pauses and self-corrections, were not coded in this process of analysis. Due to the small sample size, a descriptive analysis was undertaken.

## 4. Results and Discussion

The coding of the data was undertaken over five stages. This process was based on the progression of the analysis through four distinct stages of grounded theory analysis: code, concept, category, and theme. In stage 1, the transcripts were coded by author 1

and author 2, and from this coding process the main concepts were identified. Codes, according to [44], are the labels that are given to the extracted data. In stage 2, these main concepts were then discussed and interrogated for relevance to the study by authors 1 and 2. Concepts are explanatory words or terms that group the codes that share similar ideas [43]. In stage 3, author 2 developed a draft set of 10 categories that were then reapplied to the previously coded transcripts. Categories are seen to be higher in level and perhaps more abstract than the concept that they represent [45]. In stage 4, the number of categories was reduced to four main themes. Themes are seen to be the highest level of abstraction [44]. In stage 5, these themes were then used as the basis for the detailed analysis of the transcripts. This approach is deemed appropriate in the generation of the themes on the basis of [43,45]. The themes that were generated through this process are presented in Table 1. Given the small sample size, a descriptive analysis of the results is provided in the context of each of the four themes.

**Table 1.** Sustainability data themes.

| Theme | Key Understandings |
|---|---|
| 1. Understandings of Sustainability | • Limited understanding of sustainability<br>• Sustainability as an environmental concept (e.g., renewable resources, saving the environment)<br>• Sustainability as a business concept (e.g., financial opportunities and cost savings)<br>• Sustainability as an equity concept (e.g., equal access to resources) |
| 2. Sustainability in Education | • Limited understanding of the teaching of sustainability concepts in education<br>• Difference between developing and first world countries<br>• Relevant to all learners as a 21st century knowledge and skill<br>• Contextualized in IT in key areas (e.g., project management, programming, and resourcing)<br>• Needs institutional support and ongoing access to resources<br>• Opportunities for using novel pedagogies (e.g., artificial intelligence, gamification of learning)<br>• COVID-19 provided opportunities for developments in approaches to online learning |
| 3. Attitudes and Beliefs | • Face-to-face teaching provides better opportunities for social learning<br>• Engagement of students in online learning in challenging<br>• Online learning provides opportunities for better access (e.g., flexible, anywhere, anytime, less costs)<br>• Sustainability will be important as a concept in the future |
| 4. Governance, Resourcing, Planning and Support | • No difference between private and public institutions<br>• Resources as a difference between private and public institutions<br>• Governance frameworks as a difference between private and public institutions |

Theme 1—Understandings of Sustainability

The first three questions in the interview schedule were centered on the teacher's understandings of sustainability. This included providing a definition of sustainability (question 1), the role of sustainably in education (question 2), and the United Nations Sustainable Development Goals. These questions were related to the participants' general knowledge of sustainability and sustainability in education.

In regards to the first question on providing a definition of sustainability, it was found that the participants had a fairly limited understanding of sustainability as a concept, and that their definitions were conceptualized in three main areas: (1) Sustainability as an environmental concept (e.g., renewable resources, saving the environment); (2) Sustainability as a business concept (e.g., financial opportunities, organizational structure, and cost savings; and (3) Sustainability as an equity concept (e.g., equal access to resources). For example, Participant 1 said that:

*"It is a way in which we can come up with systems that are, that can relate well to the environment."*

This is indicative of an understanding of sustainability that is grounded in preserving the environment.

Participant 3 stated:

*"What you call that processes and practices in your organization, so that it is long lasting and continues to grow."*

Participant 3's response demonstrates the understanding of sustainability as a business concept.

Participant 10 stated:

*"So in my opinion, sustainability is something which is long lasting, which has more impact social impact and useful."*

Participant 10's response demonstrates their understanding of sustainability as an equity concept. What this demonstrates is that the participants did not see sustainability as a holistic concept as it is put forward in the literature, as the integration of three equal dimensions: environmental, social, and economic, system [18]; rather they saw it as dependent on a context that they were perhaps more familiar with, such as preserving the environment.

In regards to the second question relating to teaching sustainability, it was evident that of the 10 participants no-one could provide a clear description of how to teach sustainability concepts. The majority of the participants were honest in their lack of knowledge and experience in this area.

Participant 2 stated:

*"In accounting we didn't cover too much regarding sustainability."*

Participant 4 indicated that it could be an area of interest:

*"If they want to learn about, like, environment, if they want to learn about any other topics, okay, we can conduct some activities and select some field work so [as] to indulge them in [that]."*

Participant 10 clarified:

*"Okay, so, to be honest, I have never thought any goals related to sustainability."*

Question 3 asked participants to define what the United Nations Sustainable Development Goals were. None of the participants were able to accurately define the goals or were familiar with the integration of the goals into an education context. Only Participant 1 had a background knowledge of the goals in stating that:

*"I'm sure the seventeen goals were introduced by the United Nations. If I'm not mistaken, they were introduced in 2015. And, yeah, there are seventeen goals. One of the goals is physically to save our climate by using EVs electric vehicles. And yeah, I just do not know them off my head ... in 2021, the United Nations also emphasized those goals through the Glasgow conference."*

What is evident in the analysis of the first theme is that the findings of this study are consistent with the literature in that the teachers involved in this study, at present, lack the necessary training and understanding of the key concepts, such as a definition of sustainability, to be able to teach sustainable education [32,33].

Theme 2—Sustainability in Education

One of the key goals in this study was to discuss the experience of teachers in teaching sustainability online in private academic institutes in Australia and to gain an understanding of the challenges faced by teachers in teaching sustainability online in private academic institutes in Australia.

In the interviews in question 4, the participants were asked to provide some examples of teaching sustainably. In question 4, again, the participants had limited knowledge of how

to teach sustainability, but that it centered on clarifying the difference between developing nations and differing access to resources. For example, Participant 1 put forward that:

*"You know [in] Asia, in Africa, where people do not even have digital technologies, so we cannot expect them to participate."*

Participant 2 provided an example of teaching in a rural setting:

*"You need to package your knowledge to your student to let them know what is going on [currently] in the rural life."*

Participant 5 suggested that there should be a discussion about developing countries:

*"First about developing countries, they can compare and look at different countries."*

In question 5, the participants were asked about what they thought were the benefits of teaching sustainability in education. We found that the participants had a limited understanding of the teaching of sustainability concepts in education; however, most saw sustainability as being relevant to all learners as a 21st century knowledge and skill. Participant 6 demonstrates this in stating that:

*"So, the first thing is to become a good citizen, so we all have to become good citizens, you know, so we need, it's just not [about] being good technology or researchers . . . I think when sustainability was first introduced to me, I thought [it] was only ever the environment."*

Participant 8 provided a similar response in stating that:

*"We are going to prepare the new generation for the issues that they will be facing. Because change should start now and [to] change, you start with them."*

Overall, the results are consistent with the literature, which shows that despite note being able to provide clear examples of teaching sustainability, teachers are aware of environmental problems, and that they tend to focus on system thinking and citizen participation [25–28].

We asked the participants a few questions about embedding artificial intelligence (AI) and other advanced technologies in teaching and learning. We found that that most of the participants were quite open to using AI tools in teaching sustainability online. For example, Participant 2 stated that:

*"AI-powered training tools that can be incorporated with Moodle. Chatbots can be useful."*

Participant 1 predicted that: *"We might have robots to teach students in the [near] future"*, hence, AI practices would help attain sustainability in higher education.

Participant 4 stated that:

*"Using AI we can keep track of their participation and help them with personalized learning to get good grades."*

These results are consistent with the findings in the current literature where various authors [45–51] found that AI tools can be used to attain sustainability by improving student grades, identifying learning styles, and recommending personalized learning styles to students based on their performance in particular subjects, etc. On the other hand, two participants mentioned that, since AI has not yet been fully adapted in various sectors, human interaction is always beneficial. These participants said that: *"I believe that the advantages that we can get from artificial intelligence are not yet fully tapped"* and *"AI is not a hundred percent ready"*. Similarly, one participant was unaware of use of AI tools in education.

Following are a few observations based on the questions of gamifications in online teaching and their importance in teaching sustainability. Based on the interviews, we note that all the participants were great ambassadors in the use of gamification in teaching sustainability online. Based on the personal experiences of participants, they found that gamification is a great approach for improving students' self-learning, engagement, participation, and interaction; For example, Participant 2 stated that:

*"Gamification is an interesting and novel approach that enhances students' engagement"*.

Similarly, Participant 4 stated that:

*"I think they will be helpful as well, because one of the main things is, which we lack in online education, is the interaction of the student with the lecture to make it [a] more interactive session. It is good to use games and involve the students in it."*

Several participants suggested that students enjoy participating in class tasks that use gamification strategies with great enjoyment and pleasure, which creates an inclusive and friendly educational environment that helps to maintain an atmosphere for sustainable education. For example, Participant 3 stated that:

*"We are trying to create inclusive education, where people are free to learn, not because they are pushed you to do so. Gamification can help, which can push people to do things because they want to do, not because they're being forced to do [them]".*

These findings are consistent with those in the literature where various authors [48,52,53] state that gamification has manifold benefits, e.g., it may help in decision-making, enhancing student engagement, and data analysis.

Furthermore, we asked participants about the opportunities and challenges faced in teaching online during the COVID-19 pandemic. It is important to note that the abrupt shift from face-to-face to online learning during the pandemic has brought many challenges and opportunities [54]; hence, understanding this dramatic shift from the perspectives of teachers is important as it will enable institutions to make informed decisions regarding future online and remote teaching. We asked the participants about such challenges and opportunities, and we note that the participants had appreciated the opportunities that remote online teaching brought and informed us of a few insignificant challenges; however, they were optimistic about overcoming those challenges with the passage of time. The participants mentioned:

*"COVID pandemic actually made the academics to appreciate the use of digital technologies, which can only lead to sustainable education or sustainable living."* (Participant 1)

and

*"Instead of having two different classes, which [are] face-to-face classes, with the pandemic when we go online, we can have one single classroom cost. It will, it may be cost effective as well."* (Participant 3)

Furthermore, the participants mentioned that institutions have realized that traditional face-to-face teaching can be replaced with online teaching (Participant 6), which is cost effective and offers flexibility of teaching many courses (Participants 3 and 8). Moreover, the participants noted that teachers could record lectures (Participant 8), which will help gain sustainability in higher education (Participant 7). However, the teachers and students need to learn how to learn by distance [55–57] as it requires specific teaching and learning skills (Participant 8); in particular, student engagement was raised as a challenge (Participant 3). The participants stated:

*"Adapt[ing] to new way[s] of teaching is a challenge. Increas[ing] number[s] of students can access education anytime, anywhere."* (Participant 5)

and

*"Because you never know what the student is doing, most of the students, even if you ask them to turn on their camera when they're having the class."* (Participant 3)

Consequently, we note that the participants had limited knowledge of teaching sustainability in education and that they believed the disparity between developing and developed nations to be a distinguishing criterion (e.g., resources availability, actions taken against global warming, etc.) We observed that the participants appreciated the necessity of the integration of AI and gamification tools in education, specifically in online teaching, to help students achieve self-learning capabilities, and encourage engagement and interactions. In addition, the participants realized a great shift in teaching and learning practices during

COVID-19 that brought many opportunities; however, novel pedagogies, such as AI and gamification, can enhance sustainability in education.

Theme 3—Attitudes and Beliefs

The third section of interview questions was designed to understand the teaching practice on sustainability learning materials (questions 10–14). The interview results demonstrate teachers' positive attitudes towards sustainability as 9 out of 10 participants had embedded learning materials on sustainability in their classes. Most of the participants did not provide concrete descriptions/examples, suggesting that participants had done it in an indirect way. Three participants were able to link their embedded sustainability learning materials to specific topics. Participants 1 and 8 mentioned "open source software", whereas Participant 9 indicated "financial revenue models".

The interview results also show that the concept of sustainability is relevant and valuable in many areas instead of a specific discipline. Participants have taught sustainability in subjects across different fields, such as programming (Participant 1), accounting (Participant 2), project management (Participant 3), design thinking (Participant 4), and entrepreneurship (Participant 9).

In terms of the assessment of sustainability learning outcomes, the interview results suggest that sustainability learning outcomes can be assessed in multiple ways. Participants have adopted a variety of assessment types, including case study (Participant 3), design report (Participant 4), reflective journal (Participant 8), and assignment (Participant 9). Specifically, Participant 8 stated:

"There are exam questions . . . [and] reports that they need to write *about with regards to sustainability presentations."*

*"[The assessment] requires them to do some research about sustainability issues [mentioned] in the class so that they [can do their] reflections in the reflective journal."*

Participant 9 mentioned:

"The final one [assessment] is a presentation pitch for the whole business model revenue [using the] sustainability model."

Regarding student engagement, it was evident that students were engaging with sustainability learning materials. For example, Participant 7 stated:

"I definitely [think] students love the discussion about sustainability."

The reasons can be twofold. On one hand, students recognize the importance of the sustainability topic. They are glad to see how it specifically relates to various topics in their classes, and how the knowledge can be applied in their future works in industry. For example, Participant 9 mentioned:

"The United Nations goals are absolutely the central and key components . . . [Students] have to embrace what the goals are, why having these goals, how to achieve these goals."

Participant 3 also stated:

"If they can apply those techniques in the practical industry, and they have those skills and techniques, I think they will definitely like it."

On the other hand, student engagement is also related to how sustainability learning materials are delivered. It is important to adopt suitable teaching tools and methods to ensure the success of student's knowledge acquisition on sustainability information. For instance, Participant 8 has used "personalized learning gadgets", and Participant 7 has encouraged students to share their opinions and participate in in-class discussions. Both strategies were proving to be successful.

Theme 4—Governance, Resourcing, Planning and Support

One of the key objectives of this study was to understand how private institutes can help their teachers to teach sustainability online effectively. In addition, it was also explored whether the participants think sustainability will gain popularity in the near

future. Therefore, the last two questions in the interview were focused on the strategy and planning for teaching sustainability.

In the interviews in question 14, the participants were asked how their institutes could support them to teach sustainability online effectively. The majority of the participants stated that there are many ways their institutes can support them in terms of resourcing and policy. Workshops or training were mentioned most frequently, and other types of support included sufficient resources and clear policy, followed by updating curriculum or learning materials to include sustainability concepts.

Participant 1 stated:

"They should support us to provide workshops, where we can standardize the teaching of our own units."

Participant 3 provided a similar response by stating:

"So, like, support is academic support in the sense that they can do different workshops with the students . . . "

Participant 8 mentioned the support in terms of the curriculum in stating that:

"So, first of all, obviously it's in the curriculum so by providing resources such as books, maybe video clips that we can use, policies and procedures that we can refer to."

Participant 2 added:

"We need to update our learning material more frequently to know what's going on . . . "

Participant 4 stated:

*"Next, school can conduct some projects where we [are] all indulging to learn more about the sustainability [in] these fields, will have more knowledge about the sustainability."*

After analyzing the responses, the primary support teachers required from their institutes was to enhance their knowledge and practice on sustainability to teach sustainability online effectively. Such support could be in the form of workshops, updating curricula, practicing sustainability within the institute, drawing on the expertise of subject matter experts or guest lecturers, or embedding sustainability concepts into new courses or units.

In the final question of the interviews, the participants were asked if they thought that teaching sustainability would gain popularity within the next 5 to 10 years. All the participants stated that sustainability would be an essential concept in the future.

Participant 8 mentioned:

*"Obviously, yes the natural disasters become more intense and kill more people and we, and our eyes are more open to the damage that we have already done to the environment. And more flooding and all the stuff and, obviously, it will be a big issue, yeah, everybody will be talking about sustainability, the next 10 years definitely."*

Similarly, Participant 1 stated:

"I think that it will gain popularity, but if, and only if it is [approached] properly . . . "

Participant 1's response demonstrates that teaching sustainability will only gain popularity if done correctly. The participant mentioned that people should be aware of this area; teachers should attend conferences on sustainability to enhance their skills. In summary, awareness is the key to increasing the popularity of sustainability in future.

The central aim of the questions (related to sustainability in private higher education and differences in private and public institutions) was to explore the challenges and possibility of accomplishing sustainability in higher educational institutions, particularly in private institutions. The participants mentioned when compared to public universities (Participants 1, 2, 6, 7, 8) that the main challenges with the private institutions was the lack of resources (Participants 1, 2, 3, 8) and limited access to them in order to accomplish the sustainability goals in higher education. The participants mentioned:

*"There's not a lot of difference when you deliver sustainability, through public sector or private sector, only resources matter, I think."* (Participant 2)

*"Difference is that the public sector universities have more funding available to get the licenses of different softwares and then they can use them."* (Participant 3)

*"Universities have lots of resources on their disposal, they get funding from the government as well, so they can have more chance to sustain their delivery and courses."* (Participant 3)

This argument was also supported by the authors in [57] based on the data collected and analyzed from 15,133 higher education institutions. The authors concluded that the private and public higher institutions offer diverse degrees and curricula, link higher education to knowledge production, and target diverse labor markets. Furthermore, they mentioned that the private institutions were less likely to offer resource-intensive programs, offered fewer degree programs, and were more likely to offer labor market-demanded programs.

## 5. Conclusions

Academics are an integral part of providing higher education for sustainable development through their teaching and learning processes, achieving goals and objectives. Compared to face-to-face teaching, there are a number of concerns when we assess and attempt the practices of teaching sustainability in distance electronic learning in the post-COVID-19 pandemic world. When it comes to implementing sustainability in education and in e-learning particularly, many private institutes are facing their own unique challenges.

This paper aims to understand how an Australian private education provider embeds sustainable development in its teaching, research, and the personal and professional development of both students and the teaching staff. To accomplish these goals, this study used structured interviews where ten participants were interviewed. To analyze the results, a five-stage process based on the progression of the analysis through four distinct stages of ground theory analysis was applied. At the end of the process, four themes emerged: understandings of sustainability, sustainability in education, attitudes and beliefs, and governance, resourcing, planning, and support. A detailed analysis of the interview transcripts was undertaken based on these four themes.

The first theme was centered on the teachers' understanding of sustainability. The findings from this theme pointed to there being a lack of necessary training and understanding of the key concepts among the teachers, which is consistent with the literature. Therefore, it is recommended to arrange necessary training for the teachers to increase their understanding of sustainability.

Theme 2 aimed to highlight the experiences of teachers in teaching sustainability online and to gain an understanding of the challenges faced by teachers in teaching sustainability online in private institutes in Australia. Based on the responses from the participants, it was noted that the participants had inadequate knowledge of teaching sustainability in education, though the participants saw the potential for the integration of AI and gamification tools in education, specifically in online teaching. Further research can be conducted to determine the effectiveness of integrating AI and gamification tools in sustainable education.

The third theme was understanding the teaching practice on sustainability learning materials. Though most of the participants did not provide concrete examples or descriptions, they demonstrated positive attitudes towards sustainability. It was also observed that the concept of sustainability is relevant in many areas instead of being a specific discipline.

The last theme explored how private institutes can help their teachers to teach sustainability online effectively. Workshops or training were identified as being the most helpful means of support, and the other means of support were having sufficient resources and clear policy, followed by updating curricula or learning materials as the primary support teachers required from their institutes.

This study interviewed ten participants who had teaching experience with private institutes in Australia. In future research, a larger sample size can be interviewed to explore

further insights. In addition, a comparative study between public and private institutes in Australia can be conducted to understand the differences in teaching sustainability.

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