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FACULTY OF SCIENCE

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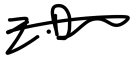
Zolile Bronwyn Duma

A research report submitted to the Faculty of Science, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science.

10 March 2025, Durban.

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted for the Degree of Master of Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



_____

(Signature of candidate)

15th day of September 2025 at Durban.

ABSTRACT

Higher Education Institutions (HEIs) are increasingly becoming proactive in achieving and promoting campus sustainability and awareness within their campuses and surrounding communities. However, attaining campus sustainability is impossible without the participation of one of the key university stakeholders, students. To ensure this, it is essential to understand students' behaviors, attitudes, and perceptions. Thus, the purpose of this research study is to investigate the attitudes and perceptions of Wits University students toward environmental sustainability (ES). Both interviews and online questionnaires were conducted with 65 students between August 2024 and September 2024. The findings revealed that while students at Wits University are both aware and knowledgeable of ES, they have low to moderate attitudes and perceptions toward ES on campus. Despite this, the results revealed that not only are students willing to participate in sustainability initiatives available on campus. The research study concludes by highlighting the need for a change in the academic program and the need for awareness campaigns.

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CHAPTER 1
INTRODUCTION

1.1. Background

In the past few years, there has been an increased global urgency to address and raise awareness around sustainability and related issues (Riekmann & Bormann, 2020). The rising levels of consumption per capita related to the fast-growing human population, climate change, and other major environmental problems are leading to increased waste production and the depletion of natural resources (Villegas-Ch et al., 2019). This has led international organizations to define new perspectives and indicators for overcoming urgent environmental issues facing humanity today (Natalia et al., 2023). Recent shifts to global interests in awareness of sustainability practices and knowledge have influenced many countries, organizations, and institutions, such as universities, to address and mitigate the disasters caused by unsustainable practices (Haque et al., 2023).

Recently, the need to incorporate sustainable development (SD) and sustainability in universities has been extensively debated due to the growing understanding of the role universities play in advancing sustainable development. HEIs are widely thought of as microcosms of societies or 'small cities or towns' because of their organizational structures, administration, geographical distribution, population size, and ecosystems (Alshuwaikhat & Abubakar, 2008; Mafongosi et al., 2018; Villegas-Ch et al., 2019). For many HEIs, "the communication of their impacts on SD is becoming essential to satisfying emerging accountability expectations from funders, policymakers, accreditation agencies, students, and faculty" (Findler & Schönherr, 2019, p. 24). Moreover, universities have the great privilege of training 'future leaders' of tomorrow who not only will be left dealing with the environmental consequences of the past and present, but as future decision-makers, they have the task of confronting these environmental issues sustainably (Abubakar et al., 2016).

Because of this, universities have a great responsibility to address rising environmental concerns and raise sustainability awareness within their environment (Syed Azhar et al., 2022; Haque et al., 2023). Several studies conducted in Western countries have noted that these countries are among some of the universities that have transformed and restructured their institutions into sustainable green campuses through green practices, research, curriculum, outreach, and policies (Filho et al., 2023). Studies have further shown that universities in developed countries have firmly established themselves on the global SD stage as leaders in campus sustainability and have students who are aware, involved in, and support

their university's sustainability initiatives, thus promoting campus sustainability (Syed Azhar et al., 2022; Haque et al., 2023).

HEIs in developing countries are increasingly becoming "key agents for improving SD on the continent" (IINSUBS Africa, 2011, p. 2). Countries like Ghana, Nigeria, Kenya, and South Africa are among the few universities in the global South that have "committed themselves to integrating SD and sustainability issues in their institutions, curricula, and day-to-day campus life" (IINSUBS Africa, 2011, p. 2). Despite the developmental challenges that African countries face, their universities continue to take measures to advance and spearhead sustainability in their institutions and societies. Nevertheless, only a "few studies are available to demonstrate what roles they play and what practices prevail in these institutions to achieve sustainability" (IINSUBS Africa, 2011, p. 5). The few studies conducted have focused on SD and related issues in HEIs in South Africa. However, little work has provided an understanding of the attitudes and perceptions of students towards sustainability in universities. Studies that have focused on students' perceptions have concluded that knowledge of sustainability and climate change among South African students is low and more research is needed in this field (Kutywayo et al., 2022; Pramjeeth et al., 2023).

Recognizing how concerned and interested students are in participating in sustainability may assist in contextualizing how a university and its students are likely to practice sustainability (Haque et al., 2023). Thus, it becomes essential to study and understand students' perceptions and attitudes to ES as this aids in the overall success of campus sustainability.

1.2. Problem Statement

In the last two decades, South African HEIs have undergone substantial developmental and reconstruction changes as the nation works to over the challenges of decade-long segregation and oppression (Pramjeeth et al., 2023). These changes include restructuring and transforming the higher education system and policies, making them "more equitable, diverse, responsive, and quality-driven HE system that contributes to the social and economic development of the country" (Pramjeeth et al., 2023, p. 2). Essentially, cementing South African universities as more than just institutions for teaching and learning but as institutions for change.

Several researchers share the consensus that because of their geographical size, population, production of future leaders, and their contribution to the environmental issues that are plaguing humanity, universities need to be proactive in addressing sustainability-related issues and promote sustainability awareness in their campus systems and surrounding environments (Mafongosi et al., 2018;

Starovoytova & Namonga, 2018; Mapatagane, 2020). To do so, universities globally are now adopting and establishing a variety of sustainability-centered strategies and initiatives that can assist them in achieving campus sustainability and SD goals (Haque et al., 2023). However, according to Mafongosi et al. (2018) and Syed Azhar et al. (2021), to achieve this, it is integral to have the participation and support of students in this process as this will be the driving force behind the sustainability change that universities seek to attain. As such, it becomes essential to investigate and understand students' perceptions and attitudes towards sustainability.

In politically and culturally diverse countries such as South Africa, students' support and knowledge of environmental issues are crucial for future campus planning activities and sustainability (Dlamini et al., 2021). According to Dlamini et al. (2021), a reason for this is that students hail from diverse backgrounds, which is reflected in the way students perceive and understand environmental issues, especially the environmental challenges that they are confronted with where they come from (Starovoytova & Namonga, 2018; Dlamini et al., 2021). Studies suggest that students are the future decision-makers of our society and will be the drivers of change (Ekka et al., 2022; Jenifer, 2022; UNDP, 2022). Thus, harnessing their passion and increasing sustainability awareness is essential as they play a vital role in sustaining the planet. At the tertiary level, the scale to which students understand environmental problems can indicate how the university plans to implement environmentally sustainable policies and practices (Dlamini et al., 2021).

In their research on investigating students' perceptions of ES at the Union of Engineering & Technology in Bangladesh, Haque et al. (2023) noted a lack of studies focusing on the attitudes and perceptions of students toward sustainability in developing countries. Dlamini et al. (2021) agree, stating that "such studies are primarily concentrated in the developed countries… noted that in these Western studies, students consistently exhibited high levels of environmental awareness and were willing to support and participate in campus ES issues" (Dlamini et al., 2021, p. 3). Similarly, while research has been carried out on South African universities' (and within the African continent) pursuit of SD and campus sustainability through waste management, energy conservation, and education (Mafongosi et al., 2018; Starovoytova & Namonga, 2018; Mapatagane, 2020; Dlamini et al., 2021; Nongqayi, 2021), limited research has provided an understanding into students' awareness and understanding of sustainability as drivers of sustainability and the change agents of the future regarding ES.

1.3. Rationale

Environmental sustainability has emerged as a paramount global issue, necessitating the involvement of all societal sectors, including higher education institutions (Riekmann & Bormann, 2020). Universities are tasked with cultivating future leaders, professionals, and citizens who possess the requisite knowledge, attitudes, and values to tackle environmental challenges (Alshuwaikhat & Abubakar, 2008; Abubakar et al., 2016; Syed Azhar et al., 2022; Haque et al., 2023). The University of the Witwatersrand (Wits University), the premier university in South Africa, can influence sustainable development through its policies, curriculum, and campus practices.

This research seeks to bridge the existing gap and provide university policymakers with insights into students' attitudes and views of environmental sustainability at Wits University to improve strategic planning, practices, and policies. Understanding students' cognition is crucial, as their attitudes, beliefs, and actions significantly influence the efficacy of sustainability initiatives both within and beyond the university context. Despite the increasing global awareness of environmental challenges, there is a lack of empirical data regarding the perceptions and practices of South African college students concerning sustainability in their daily lives and academic environments. This research focuses on Wits University, addressing a critical need and providing insights that may inform institutional policies to enhance environmental education, campus sustainability activities, and student engagement.

1.4. Research Aims & Objectives

The aim of this research is to investigate the attitudes and perceptions of Wits University students towards ES.

To achieve this aim, the following objectives have been identified:

1. The first objective seeks to understand the level of knowledge and awareness of ES among students from the School of Geography, Archaeology, and Environmental Studies (GAES). This will be done through interviews focusing on understanding students' knowledge of the concept of ES and the sources of information that help students become aware and knowledgeable of ES.
2. The second objective seeks to examine students' attitudes and perceptions of ES. This will be done through an online questionnaire survey, focusing on students' knowledge, awareness, attitudes, and perceptions of ES on campus. The questionnaire will relate to students' general awareness of ES, their attitudes towards ES on campus, and their perceptions of sustainability programs and initiatives on campus.

3. The third objective seeks to examine factors influencing students' decision to act sustainably. This will be done through an online questionnaire survey, focusing on what influences students to act sustainably and their willingness to participate in sustainability programs and initiatives on campus.

1.5. Structure of the research report

This project seeks to argue for the importance of understanding students' attitudes and perceptions towards ES as this can provide university authorities and campus managers with insight into how best to strategically plan and implement sustainability in universities, thus aiding in the overall success of campus sustainability. This research report comprises seven chapters (including the above introductory chapter) in which the researcher attempts to develop a thorough response to the research aim. To accomplish this, the study is unpacked in the following way:

In Chapter Two, I provided an overview of the main literature themes that frame this research study, such as sustainability and SD, higher education in the context of SD, and attitudes and perceptions. I reviewed existing literature on the general definition of the concept of SD and sustainability and how it has evolved to be incorporated and promoted in educational institutions. Literature shows that it has become necessary for educational institutions to be aware of the main topics of and actively contribute to SD. The chapter then reviews the role both universities and students play in driving ES in universities and society and contributing to SD. The chapter then concludes by identifying gaps in the literature on students' attitudes and perceptions, where it illustrates the limited research on this topic in South Africa and how it can be an indicator of students' understanding and awareness of sustainability. The following chapter presents the research methodology used to collect and analyze data.

Chapter Three discussed the research methodology used to achieve the three primary objectives of this research study. The chapter provides information on the study area and population, the chosen research methods, as well as data analysis techniques. To collect the relevant data, I relied on both interviews and online questionnaires. The chapter also discusses in detail the ethical considerations that the researcher had to adhere to. Empirical data for this research study is presented in chapters four, five, and six, by each objective for each chapter.

Chapter four provides the findings that relate to the first objective of this research study, aimed at investigating students' knowledge and awareness of ES. The research findings and discussions in this chapter are divided into two sections according to the themes produced after the coding process.

Section one discusses students' understanding of the concept of ES. Section two provides insight into students' sources of information that influence their awareness of ES.

Chapter five provides findings that relate to the second objective of this research study, aimed at understanding students' attitudes and perceptions toward ES. The research findings and discussions in this chapter are divided into three sections. Section one provides a description of the demographics of the respondents. Section two discusses students' concerns and attitudes toward ES, and lastly, section three discusses students' perceptions of ES.

Chapter Six provides findings for the third objective of this research study, aimed at understanding the factors that influence students' decisions to act sustainably. This chapter provides the research findings and discussions from sections five, six, and seven of the questionnaire survey which include understanding what are some of the factors that influence students to act sustainably, understanding the types of sustainable and environmentally friendly practices students engage in on campus and in their daily lives, and the willingness of students to participate in sustainability initiatives on campus.

The final chapter, Chapter Seven, presents the limitations, a summary of the findings, and recommendations. The chapter commences by presenting the limitations of the study, followed by a summary of the results linked to each of the objectives. Based on these concluding findings, recommendations are presented for future research.

CHAPTER 2
LITERATURE REVIEW

This chapter provides a review and discussion of some of the key literature themes and concepts that frame this research study, including sustainability and SD, higher education in the context of SD, and attitudes and perceptions. The researcher reviews existing literature on the general definition of the concept of SD and sustainability and how it has evolved to be incorporated and promoted in educational institutions. The literature also covers the roles both students and universities play in contributing to sustainability as well as the converging relationship between attitudes, perceptions, and behaviors in individuals and the factors that influence these perspectives.

2.1. Conceptualization of Sustainable Development & Sustainability

The concept of sustainable development has been widely used and adopted, with almost everything in society being carried out under the umbrella of sustainable development. According to the 1987 Brundtland Report, "sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987, p. 37). The concept is often used simultaneously with the sustainability concept, which is based on the triple bottom line theory, "namely that the three spheres- social, economic, and environment, have the same importance and are strongly interconnected" (Syed Azhar et al., 2022, p. 1). The World Commission on Environment & Development (WCED) provides a similar definition to that of the Brundtland Report (1987) that is widely accepted, stating that sustainability is "the ability to meet the needs of the present while living within the carrying capacity of supporting ecosystems and without compromising the ability of the future generations to meet their own needs" (WCED, 1987, p. 46). While the terms remain ambiguous, Sadusky (2014) suggests that these "descriptions are necessarily broad so that various organizations with various goals can apply the definition to their workings" (Sadusky, 2014, p. 4). For the purpose of this study, SD will refer to the definition provided by the Brundtland Report (1987) and ES will refer to the definition provided by Haque et al. (2023) which states that ES is "the responsibility to preserve natural resources and maintain global ecosystems to support health and well-being today and in the future" (Haque et al., 2023, p.172).

In 2015, 17 Sustainable Development Goals (SDGs) were established by the United Nations as part of the 2030 Agenda for Sustainable Development, to create an international partnership for all countries to eradicate poverty and deprivation and to put forward suggestions for promoting institutionally based

efforts that are more sustainable (Concina & Frate, 2023, p.705). Different areas have been included in the 2030 Agenda such as health, economic growth, social equity, the environment, and education, with the aim of "promoting an exhaustive overview of human development, which is intended to be respectful not only of people and the environment here and now, but also of future generations in a long-term perspective" (Concina & Frate, 2023, p.705).

Literature indicates that it has become necessary for educational institutions, where young adults are being prepared to become responsible and active citizens of the future, to be aware of the main topics of and actively contribute to SD (Sadusky, 2014; Syed Azhar et al., 2022; Concina & Frate, 2023). For example, Kutywayo et al. (2022) reviewed climate change knowledge and concerns among secondary school learners in South Africa and stated that to solve the environmental complexities, schools need to establish a firm foundation of knowledge and understanding of climate change and sustainability among school learners. Developing this understanding is also a target of the SDGs, particularly target 13.3 – "improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning" (Kutywayo et al., 2022). Findler & Schönherr's (2019) review of the impacts of HEIs on sustainability notes that sustainability in universities can be promoted through charters, declarations, global partnerships, and sustainable campus initiatives as well as redesigning the curriculum.

2.1.1. Higher Education for Sustainable Development

According to Findler & Schönherr (2019), HEIs have increased their involvement in SD since the conception of the term in 1987; and the movement was further promoted through the UN Decade of Education for Sustainable Development (DESD) in 2005. Education is recognized as an essential tool in creating and promoting the vital knowledge, values, and skills required to champion SD (Balakrishnan et al., 2020). Education for Sustainable Development (ESD) is acknowledged as one method of disseminating the principles and concepts of SD to large groups through education (Balakrishnan et al., 2020). According to Kariaga et al. (2013), ESD is a holistic approach to education "that enhances SD with the mission to provide an enabling environment and capacity for all sectors and stakeholders to contribute effectively towards the achievement of sustainable development" (Kariaga et al., 2013, p.1). Education and learning are the foundations for SD approaches (Kariaga et al., 2023), this is highlighted through some of the SDGs, namely, targets 4 and 13. For instance, target 4 stands to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (UN, 2024, p.9). This target reaffirms the shared consensus that education is a powerful and necessary tool for achieving SD in HEIs (Pramjeeth et al., 2023).

According to van den Berg & Verster (2023), the enactment of ESD "depends on a university implementing interdisciplinary projects that integrate sustainability principles among university staff, students, and their local and wider communities" (van den Berg & Verster, 2023, p.9). Thus, there is no one-size-fits-all approach to ESD in universities (Montgomery-Whicher, 2022). Despite this, Balakrishnan et al. (2020) outline two approaches that can integrate ESD in universities, which can also be used "collaboratively to contribute to the promotion of the main values of SD" (Concina & Frate, 2023, p.706), these include formal and informal learning approaches. According to Balakrishnan et al. (2020), "some institutions use a formal learning approach with organized and systematic content and a syllabus on SD, while other universities use an informal learning approach by incorporating experiential learning" (Balakrishnan et al., 2020, p.45). Concina & Frate (2023) stress the need for "sustainability topics to be introduced and developed in every academic field, not only in courses dealing with the environment and ecology, for addressing the great variety of needs that have been identified for promoting a more sustainable future" (Concina & Frate, 2023, p.706).

According to van den Berg & Verster (2023), "ESD is often viewed as an 'action competence approach' aiming at empowering students to take action to tackle complex issues related to sustainable development" (van den Berg & Verster, 2023, p.9). Through ESD's promotion of critical thinking and learning activities, students not only have the ability to obtain knowledge and awareness of pressing themes and issues related to sustainability but also have the opportunity to develop positive attitudes and behaviors towards SD (Prasetiawan & Wasisto, 2021; Concina & Frate, 2023; van den Berg & Verster, 2023). Therefore, studies stress the need to examine students' perceptions of SD and the potential HEIs have in transferring positive attitudes and behaviors toward ES (Syed Azhar et al., 2022; Concina & Frate, 2023).

2.1.2. Green Campus Initiatives

It is widely agreed that HEIs can encourage and facilitate societal change by incorporating SD and sustainability goals into research and curricula, which can ultimately result in active and well-informed leaders and citizens (Concina & Frate, 2023; van den Berg & Verster, 2023; Thondhlana & Nkosi, 2024). However, for a university to achieve campus sustainability goals, Thondhlana & Nkosi (2024) suggest that universities create "new socio-cultural models where daily university operations are informed by sustainability principles and environmental policies, and campus leadership is active in promoting sustainability practices" (Thondhlana & Nkosi, 2024, p.2). To do so, universities are actively adopting and implementing green campus initiatives (GCI) in their strategic management

systems to contribute positively to ES as well as knowledge and awareness creation (Rwelamila & Purushottam, 2015; Abubakar et al., 2016).

According to Humblet (2010), a green campus (or a sustainable university) is a "higher education community that is improving energy efficiency, conserving resources and enhancing environmental quality by educating for sustainability and creating healthy living and learning environments" (Humblet, 2010, p.4). The goal of GCIs in universities is to mitigate the adverse effects of excessive resource consumption on the environment by assisting universities in designing and constructing sustainable systems and practices (Mafongosi et al., 2018). Rwelamila & Purushottam (2015) outline the main GCI activities which include the "management of green buildings, energy, water, food, transportation, purchasing, waste, and sustainable landscaping" (Rwelamila & Purushottam, 2015, p.368). Thondhlana & Nkosi (2024) state that promoting positive transformation in HEIs depends on the integration of a culture of sustainability that includes lifestyle and behavior choices and awareness which can be informed by the university's sustainability and environmental considerations. Rwelamila & Purushottam (2015) & Abubakar et al. (2016) argue that GCIs go beyond statements or policies of intent to include actionable practices and projects across all university operations that promote ES and raise environmental awareness, thus, instilling a culture of sustainability in all its stakeholders (staff and students).

Given the growing complex impacts of climate and the realization of HEI's contribution to environmental impacts- due mainly to their extensive operations, it prompted the emergence of the GCI in universities globally and regionally such as the UK, Malaysia, Namibia, and South Africa (Rwelamila & Purushottam, 2015). In 2012, the then Minister of Higher Education & Training, Mr. Blade Nzimande launched the GCI in South Africa to make universities cognisant of the risk their daily operations pose to the environment (Mafongosi et al., 2018). In addition, the initiative also aimed to "provide students with the necessary skills and knowledge to address and overcome sustainability issues, not only on their campuses but also in their communities" (Mafongosi et al., 2018, p. 2212). However, while over 20 universities in the country have adopted the concept of the GCI into their operations and systems, many universities are struggling to fully implement the initiative (Mafongosi et al., 2018). According to Rwelamila & Purushottam (2015), a reason for this struggle is due mainly to a lack of financial resources, limited knowledge about the GCI as well as a lack of support from HEIs' stakeholders.

According to Filho (2011), for the GCI to be successful and effective, it requires the participation of all stakeholders (staff and students) and an understanding of their perceptions. Alishuwaikhat &

Abubakar (2008) argue that fostering campus sustainability requires establishing a distinctive organizational culture and a clear vision supported by sustainability initiatives, declarations, and policies to encourage and raise sustainability awareness. By doing so, it can yield positive environmental behaviors, choices, and perceptions. For instance, the University of California's dedication to lowering emissions was realized by raising awareness of renewable energy and efficiency programs and initiatives (World Sustainability Forum, 2016). As a result of these measures, the university was able to reduce its greenhouse gas (GHG) emissions by 4.5%, the lowest level for the university since 2005. Therefore, assessing staff and student's knowledge and perceptions of sustainability can reveal how campus sustainability is understood and accepted (Thondhlana & Nkosi, 2024)

2.2. Universities' Role and Commitment to Environmental Sustainability

Considering the notable environmental impacts of their intricate operations and extensive undertakings, universities are no longer spared regarding environmental and social responsibilities (Green, 2013). Hence, including environmental sustainability in HEI systems has increasingly become essential today. Syed Azhar et al. (2022) argue that this is also "due to the level of consciousness in society around sustainability issues and the significant impacts of campus activities on both the environment and communities" (Syed Azhar et al., 2022, p. 2).

Several noteworthy international declarations have highlighted the specific role universities play in promoting SD. For instance, according to the Rio+20 Higher Education Sustainability Initiative (2012), teaching SD concepts and ensuring they form part of the curriculum is one aspect in which universities can promote SD in their environment. Pramjeeth et al. (2023) agree with this, stating that "education is widely acknowledged as crucial to the achievement of sustainable development" (Pramjeeth et al., 2023, p. 1). Based on the study on students' sustainability awareness at the University College Sabah Foundation in Malaysia, the researcher concluded: "that efforts to increase the awareness of the students further can come from formal education and through the dissemination of sustainability information" (Mojilis, 2019, p. 10). Consequently, HEIs globally are actively adopting and promoting sustainability and raising awareness of sustainability-related issues through community outreach, research and learning, and campus initiatives and operations.

A sustainable campus, according to Haque et al. (2023), is a HEI that puts into place and advocates for sustainable practices and approaches in campus planning, community outreach, research, and teaching and learning, as illustrated in **Figure 1**. Furthermore, Abubakar et al. (2016) consider "a sustainable

campus as a healthy environment with an efficient environmental management and prosperous economy based on energy and resource conservation and waste reduction, and promoting equity and social justice in its affairs and exporting these values at community, national, and global levels" (Abubakar et al., 2016, p. 3). These descriptions illustrate that campus sustainability needs not only the incorporation of SD fundamentals in research, curriculum, and outreach but also calls for teaching and learning approaches that are interactive and that encourage and inspire students to act positively toward SD (Alshuwaikhat & Abubakar, 2008; Abubakar et al., 2016).



Figure 1. The key components of a sustainable campus (Adapted from Mafongosi et al., 2018).

Literature suggests that HEIs constitute a significant driver of change for achieving ES, health, economic prosperity, and sustainable living, as well as instilling students with a sense of environmental and social responsibility (Alshuwaikhat & Abubakar, 2008; Abubakar et al., 2016; Haque et al., 2023). Universities play a leading role as sources of expertise by coordinating and enhancing engagements between government, private sectors, NGOs, local authorities, and the public in implementing sustainability plans (Abubakar et al, 2016). According to Syed Azhar et al. (2022) and Haque et al. (2023), through research and teaching, HEIs play an essential role in fostering SD and sustainability knowledge and equipping the next generation of leaders with the necessary skills and knowledge to secure a sustainable future for all. Alshuwaikhat & Abubakar (2008) add to this, suggesting that universities are effective avenues for communicating environmental issues troubling society and the value of sustainability in addressing these issues to a wide range of people.

Scholars (Alshuwaikhat & Abubakar, 2008; Abubakar et al., 2016; Syed Azhar et al., 2022; Haque et al., 2023) agree that one of the ways of achieving sustainability of cities and regions is through raising awareness and integrating sustainability across the entire university system, this in turn promotes positive attitudes and perceptions of ES among students. This results in students being well-equipped to tackle sustainability-related issues in society and participate in practices that influence both global and local futures.

2.3. Students' Role and Participation in Environmental Sustainability

Sustainability is a concept that has grown over the years and has been discussed most prominently in key international agreements and events. These key agreements and events highlight young people's crucial role in driving sustainability and advocate for their involvement in this growth (Pedro et al., 2023). Furthermore, youth are acknowledged as being an essential component in the current sustainable development framework and the realization of sustainable development goals, "with at least 10 out of the 17 SDGs exhibiting a clear correlation with this demographic group, encompassing their growth and advancement" (Pedro et al., 2023, p. 2). Moreover, a 2018 Youth Speak global survey (that included young individuals from across the world) showed that 59% of young people felt that society will be in an improved state by 2030, and 20.5% of the respondents believed that the most effective means to influence society is through youth-led organizations (AIESEC, 2020). Therefore, youth are the building blocks for future sustainable environments (Natalie et al., 2023).

According to the UNDP (2022), young people play a significant role "in achieving SDGs as a stakeholder of all social phenomena and as a group of people with the capacity to learn and enhance their own and society's development through environmental factors" (UNDP, 2022: 4). Jenifer (2022) outlines the role students play in sustainable development, suggesting that they are not only future leaders but are also critical thinkers, agents of change, innovators, and communicators of the future. For instance, as agents of change, youth can motivate and influence change in society. Ekka et al. (2022) agree with this, stating that "it is possible to regard young people as agents of change who can help construct a greener today and a better environment for future generations by using their knowledge, sharp observation, and constant action" (Ekka et al., 2022, p. 3564).

According to Pedro et al. (2023), "education for sustainability incorporates components such as the participation of various university stakeholders in the inventive process toward sustainability, as well as the empowerment of people and groups to effect change within their sphere of influence and action" (Pedro et al., 2023, p. 2). In his fundamental work on stakeholder theory, Freeman (1987) outlines the

general categories of stakeholders, such as government, community, employees, and customers. However, within HEIs, stakeholders are categorized into internal and external groups, which include faculty, alumni, staff, and students (Dabija et al., 2023; Mohammadi et al., 2023). Recognized as both important internal and external stakeholders in universities, students can influence positive sustainability impacts and actions (Dabija et al., 2023). Ekka et al. (2022) and Pedro et al. (2023) agree with this, emphasizing that student participation is both unavoidable and limitless if campus sustainability is to be achieved.

2.4. Attitudes and Perceptions

Concepts such as climate change and sustainability represent a multifaceted global issue that is characterized by multiple stressors and a wide range of agents. According to Kutywayo et al. (2022), these issues have been referred to as 'wicked problems', "where there is incomplete information and large differences between stakeholders regarding perceptions of the nature of the problem, the need for action, and the type of action that should be taken" (Kutywayo et al., 2022, p. 1). Adding to this complexity is the level of unpredictability of the different trajectories and aspects of sustainability and human behavior. Yet, for different role players to collaborate and achieve a common goal, it is crucial "that they have a shared understanding of the challenge or at least some converging perceptions on this" (Kutywayo et al., 2022, p. 1). Within the educational context, researchers believe that to solve these complexities, it is essential to examine an individual's attitudes and perceptions as well as construct a solid foundation of knowledge and understanding of sustainability and related issues (Kutywayo et al., 2022; Concina & Frate, 2023).

Over the years, the awareness and understanding of sustainability and related environmental issues have grown (Andries et al., 2012). This growing awareness allows people to understand and have a positive response to the environmental crisis the world is currently facing (Andries et al., 2012). To understand how people perceive and understand the effects of sustainability issues, it is crucial to comprehend their actions and examine their attitudes toward ES (Andries et al., 2012; Dlamini et al., 2021; Kutywayo et al., 2022). According to Andries et al. (2012), attitude can be defined as an "individual assessment of an object of thought in the person's mind towards people, the environment, situations or even ideas" (Andries et al., p.94). Syed Azhar et al. (2020) provide a similar definition, stating that attitudes are "a set of emotions, beliefs, and behaviors toward a particular object, person, thing, or event…that are developed through our experiences and exposures, and have a powerful influence over our behavior" (Syed Azhar et al., 2020, p.7). According to Mbewe (2016), an individual's "attitudes towards the environment and the type of concern they develop towards the

environment are associated with the degree to which they view themselves with nature" (Mbewe, 2016, p.7). That is to say, a person's attitude towards the environment is based on the importance and general values they place on it (Mbewe, 2016).

It has been discovered that attitude is an important predictor of behavior and intentions (Starovoytova & Namango, 2018). Owojori et al. (2022) concur, stating that attitude is a "fundamental driver of student's behavior because it directs how students will respond to environmental concerns and lead to them acting beneficially towards the environment" (Owojori et al., 2022, p.6). Bowersox et al. (2005) argued that to a certain degree, waste generation and the demand for waste collection services are conditioned by an individual's attitudes to waste through how they handle waste, use materials, their interest in waste reduction and the extent to which they refrain from littering or dumping waste (Starovoytova & Namango, 2018). Thus, Starovoytova & Namango (2018) and Mapatagane (2020) suggest the need to modify attitudes to encourage pro-environmental behavior towards ES. This can be achieved through green learning, sustainability programs and campaigns, and environmental education (Balakrishnan et al., 2020; Prasetiawan & Wasisto, 2021). In contrast, other research states that while the distribution of learning programs and information may influence an individual's attitude toward environmental concerns, it however, has little influence on changing an individual's behavior or action (Sadusky, 2014; Eagle et al., 2015). As a result, Mapatagane (2020) is of the view that people "may see the government as the sole entity that is responsible for addressing environmental issues and does not consider their contributions" (Mapatagane, 2020, p.13). This is seen as a barrier to related studies and requires further research.

Perception is a specific way of thinking about and understanding something (Starovoytova & Namango, 2018). Mbewe (2016) expands on this stating that "perception is a person's attitude and understandings that reflect their habitual way of life as well as their shared expectations" (Mbewe, 2016, p.6). According to Starovoytova & Namango (2018), perception varies from one person to another due to its subjective nature and how individuals view things such as one's knowledge, beliefs, understanding, awareness, impression, and expectations. Therefore, perception is largely influenced by an individual's setting and upbringing, which in turn affects how they perceive and react to their environment (Mbewe, 2016; Starovoytova & Namango, 2018). Environmental perception is widely understood as the interaction humans have with the environment and determines whether people's attitudes towards the environment are for or against it (Starovoytova & Namango, 2018). For example, an individual will develop an understanding of their surrounding environment, and based on this

understanding and previous experiences, the individual decides how to act and respond to it (Mbewe, 2016).

2.4.1. Factors Influencing Perceptions, Attitudes, and Behaviors

Studies on attitudes and perceptions have spanned several disciplines, such as sociology, psychology, communication, waste management, and sustainability (Dlamini et al., 2021). These studies acknowledge the importance of understanding factors that influence perceptions and attitudes in involving individuals in environmental conservation and sustainability initiatives (Mbewe, 2016; Dlamini et al., 2021). Thondhlana & Nkosi (2024) agree with this stating that outside of creating a sustainable curriculum to increase awareness and knowledge among students, there are important perspectives such as values, beliefs, and norms that are conveyed and embraced in university environments that should also be taken into consideration when trying to effect change and understand individuals. Understanding and embracing norms, beliefs, and values can assist universities in promoting campus sustainability, increasing environmental awareness, and assist campus managers in adapting and improving sustainability strategies and programs to reflect the needs of students (Sadusky, 2014; Mbewe, 2016; Thondhlana & Nkosi, 2024).

According to Owojori et al. (2022), knowledge is related to the ability to accept and understand behavioral patterns and ideas. Owojori et al. (2022) go on to add that increasing students' knowledge of environmental issues can enhance their attitudes and awareness towards ES, thus, leading to pro-environmental behavior. Beliefs are considered a powerful tool in influencing how an individual perceives the environment around them. They are formed based not only on education, ethnicity, or culture but also on values and experiences (Mbewe, 2016; Starovoytova & Namango, 2018). Starovoytova & Namango (2018) concur, stating that preserving the environment is linked directly to people's culture and beliefs which are passed down from generation to generation.

According to Mbewe (2016), value is referred to as "important life goals or standards that serve as principles in life" (Mbewe, 2016, p.9). They play a crucial role in how an individual considers the choices of their actions and behaviors for the things they value. Therefore, values act as guidelines for behaviors and the formation of attitudes (Mbewe, 2016). Research shows that sustainability strategies and programs that include influencers, marketing, social networks, and social norms have a great impact on changing an individual's behavior toward sustainability (Sadusky, 2014, Starovoytova & Namango, 2018). According to Starovoytova & Namango (2018), social norms are typically referred to as "perceived standards of acceptable attitudes and behaviors within formal and informal networks"

(Starovoytova & Namango, 2018, p.10) such as peer groups, family, society, or a community. To change or create new social norms, a shift in an individual's normative behaviors and what they perceive as right or wrong is essential.

Studies have also highlighted the importance of understanding socioeconomic, cultural, and demographic characteristics as they determine how people perceive and interact with their environment (Dlamini et al., 2021). In a study by Du Plessis et al. (2012) on students' perceptions of ES, it was determined that respondents with diverse cultural, personal, and professional backgrounds approach, feel, and act differently about the environment and sustainability practices. Dlamini et al. (2021) mention that understanding students' environmental perceptions is also important in culturally diverse countries like South Africa because students come from diverse backgrounds, which could influence how they view and value environmental issues. Thus, students' perspectives on ES can give insight into how universities will develop environmentally sustainable practices and raise sustainability awareness (Dlamini et al., 2021).

2.5. Conclusion

The literature reviewed highlights the integration of SD and sustainability into HEIs, demonstrating how sustainability can be achieved in universities through academic programs and sustainability campus initiatives. These initiatives can elicit positive attitudes, behaviors, awareness, and perceptions from individuals. The research went on to make an argument for the strong role and commitment of both universities and students in promoting and achieving ES on campus and highlighted the important need for students' participation in ES on campus if campus sustainability is to be achieved. The literature provided also makes an argument that to understand how individuals perceive and understand the effects of sustainability issues, it is crucial to comprehend their actions and examine their attitudes and perceptions toward ES. In doing so, researchers believe it can provide insight into how universities will develop environmentally sustainable practices and raise sustainability awareness. Furthermore, research acknowledges the importance of understanding factors that influence awareness, perceptions, and attitudes in involving students in sustainability initiatives and academic programs.

A significant observation derived from the examined literature is that a substantial portion of the current research about student perceptions and attitudes towards ES is predominantly situated in developed countries or distinct educational contexts. There is a lack of studies concentrating explicitly on South African universities, especially in urban locales such as Johannesburg, or at institutions like

Wits University, within the framework of ES. Moreover, the examined research concentrates exclusively on attitudes or behaviors, neglecting the interplay between the two. Attitudes and perceptions do not invariably result in sustainable behavior; therefore, comprehending this disjunction can facilitate the development of more successful interventions. Moreover, there is a lack of information about the awareness, involvement, or influence of university-led sustainability programs or campaigns among students in South Africa. Sustainability policies may fail if students are not aware of them or lack interest in them.

CHAPTER 3
METHODOLOGY

In the preceding chapter, I outlined the study's goal within a broad range of literature that interrogated SD and sustainability concepts, and the understanding behind an individual's attitudes and perceptions in the context of ES. In this chapter, I detail the methodological approach applied in this study by providing an overview of the study area and population, the research methods, data collection methods about each study objective, data analysis techniques used to address the study objectives, and the ethical process this research study underwent.

3.1. Study Area and Population

The study was conducted at the University of the Witwatersrand (known as Wits University) at one of its campuses- Braamfontein Campus, as shown in **Figure 2**. Wits University is an internationally recognized public research university in Johannesburg that is ranked second in the hierarchy of universities in South Africa. Wits University has "five faculties, 33 schools, and over 40 000 registered students…and boasts two campuses- Braamfontein and Parktown campus- that are spread over 400 acres in Johannesburg" (Wits University, 2024, p.1).

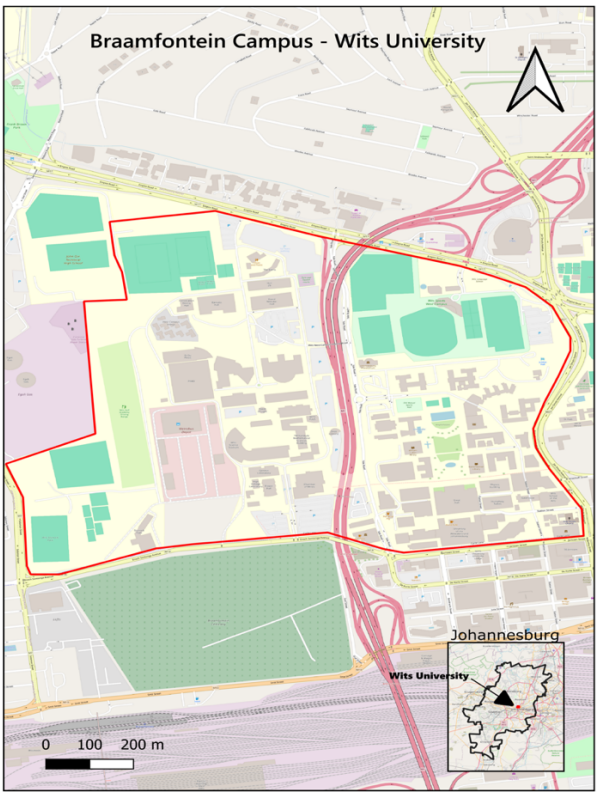


Figure 2. Map of the University of Witwatersrand, Braamfontein Campus.

Johannesburg is regarded as South Africa's biggest city and is acknowledged as the 'engine room' of the country's regional economy. The city is prone to extreme growth pressures due to urbanization, population growth, water scarcity crisis, unemployment, waste management issues, flash floods, pollution, and environmental degradation (CoGTA, 2020). These converging issues present a serious threat to SD and sustainability efforts in the city and the country. Although situated in the environmental challenges that the city faces, Wits University continues its efforts to contribute to SD and promote campus sustainability within and outside the campus through international agreements, SD targets, and climate change initiatives on its campuses (Wits University, 2024).

The chosen population for this study comprises all registered students from the Faculty of Science, School of Geography Archeology, and Environmental Studies (GAES). This was done so to understand the attitudes, awareness, and perceptions of students enrolled in the Faculty of Science, towards ES as they are the future science leaders. Doing so will assist university policymakers and managers "to evaluate their programs and initiatives, and increase their potential in supporting students' sustainability attitudes, awareness and actions on campus" (Sadusky, 2014, p. 5).

3.2. Research Methods

The research study utilized a mixed-methods approach. Utilizing both qualitative and quantitative data, assisted me in utilizing a variety of approaches for collecting data from a large population and allowed me to "generalize the findings to a broader population…and provide a deeper understanding of the problem being investigated" (Dawadi et al., 2021, p. 27). Due to the large population of respondents and the difficulty of accessing this population, the study utilized purposive sampling and snowball sampling. The NCSC (2024) explains purposive sampling as a sample selection method that "intentionally selects participants based on their characteristics, knowledge, experiences, or some other criteria" (NCSC, 2024, p. 1). Utilizing this method allowed me to select the students enrolled in the School of GAES as they are relevant to the objectives of the study. This targeted method ensured data that was rich and relevant to the goal of the study, thus, producing focused and insightful findings. Taherdoost (2020) states that snowball sampling is an approach used to increase the sample size by encouraging other participants to participate in the research study. Utilizing this method allowed the researcher to research large populations, that are difficult to reach and access, relatively quickly.

3.3. Data Collection

To execute the three stated research objectives and communicate with the participants, the researcher used various data collection methods such as online questionnaires and interviews (**Table 1**).

Table 1. Linkage between research objectives, research methods, and data collection tools.

Research aim: investigate the attitudes and perceptions towards ES among students at Witwatersrand University.			
Objectives	**Sampling technique**	**Data collection tools**	**Data analysis**
1. Investigate students' level of knowledge and awareness of ES.	Snowball sampling	Interviews	Thematic/transcriptive analysis
2. Examine students' attitudes and perceptions of ES.	Random sampling	Online questionnaire	Descriptive statistics using multiple statistical approaches such as SPSS software and Microsoft Excel.
3. Examine factors influencing students' decision to act sustainably.	Random sampling	Online questionnaire	Descriptive statistics using multiple statistical approaches such as SPSS software and Microsoft Excel.

3.3.1. Objective 1: Investigate students' level of knowledge and awareness of environmental sustainability.

Dawadi et al. (2021) suggest that while examining a "deeper understanding of a problem being investigated, honoring the voices, experiences, and perspectives of participants" (Dawadi et al., 2021, p. 27) is crucial to the process. The first objective of the study sought to investigate students' level of knowledge and awareness of ES. This allowed the researcher to understand how aware and knowledgeable students are of sustainability-related issues plaguing society. To acquire a thorough understanding of students' experiences and opinions, interviews involved all registered students at GAES.

To achieve this goal, the study conducted semi-structured interviews involving 10 participants. The interviews were conducted at the Braamfontein Campus over two days. To perform these interviews, the researcher began interviewing two participants and then continued based on the referral from the participants already interviewed. The questions included but were not limited to, asking participants: '*Please share what your main source of environmental sustainability is. What is your understanding of environmental sustainability?'* The interview questions are provided in **Appendix A**. Before participating in the survey, a consent form and a participant information letter were provided at the beginning of the study, thus, informing the participants that their involvement was voluntary and confidential, and providing them with some information on the research study.

3.3.2. Objective 2: Examine students' attitudes and perceptions of environmental sustainability.

The questionnaire in this study comprised seven sections each seeking to examine students' attitudes and perceptions of ES as well as factors influencing students' decisions to act sustainably. Section one consists of questions that are closed-ended in nature and that cover demographic information to understand the participant's background. A total of 53 respondents participated in the online questionnaire. **Table 2** summarizes the characteristics of the respondents. The largest respondents were in the 18-25 years age group at 55% and with only 17% in the 26-30 years age group. There were more female than male respondents, at 64% and 34% respectively. In terms of year of study, a large majority of respondents were post-graduate students, at 55%, the next highest being second-year students, at 15% and the lowest being third-year students at 8%. A possible explanation for the low turnout from undergraduate students could be attributed to the fact that the questionnaire was conducted during the test/assessment period and students were focused on preparing for their tests/exams. Respondents were also asked to indicate their residential status. The largest number of respondents (85%) indicated that they live off campus while 15% of the students indicated that they live on campus residential halls.

Table 2. Respondents' demographic profile.

Item		Total (%)
Gender	Female	64%
	Male	34%
	Prefer not to say	2%
Age	18-25 years	55%
	26-30 years	17%
	31-40 years	28%
Year of study	First year	13%
	Second year	15%
	Third year	8%
	Final year	9%
	Postgraduate	55%
Residential status	Off campus	85%
	On campus residential halls	15%

Section two probed students' concern for the environment, this served to understand who students think is responsible for safeguarding the environment. Sections three and four of the questionnaires investigated students' awareness and perception of ES to highlight their views and understanding of ES. To measure students' attitudes, opinions, and perceptions of ES, the responses were evaluated using Likert scales.

3.3.3. Objective 3: Examine factors influencing students' decision to act sustainably.

To examine the factors that influence students' decision to act sustainably, the study also utilized a questionnaire survey. Section five of the questionnaire focused on understanding what are some of the factors that influence students to act sustainably. Section six, focused on understanding the types of sustainable and environmentally friendly practices they engage in on campus and in their daily lives. Lastly, section seven of the questionnaire investigated the likelihood of students participating in sustainability initiatives on campus. The questionnaire is provided in **Appendix B**.

The questionnaire was distributed via participants' official Wits University student emails. The Registrar's Office/administrator assisted in inviting the students enrolled at GAES. An advantage of distributing the questionnaire online is the ease of access to participants in a large population and the ability to retrieve participants' responses in digital format. All registered students from GAES at Wits

University were invited to participate in the study, and although the survey was open to participants for a month, only 53 students participated in the survey. Before participating in the survey, a consent form and a participant information letter were provided at the beginning of the online questionnaire, thus, informing the participants that their involvement is voluntary and confidential, and providing them with some information on the research study.

3.4. Data Analysis

Following the completion of the data collection process, data analysis was conducted to interpret and discuss the responses from both the online questionnaires and the interviews. To achieve the objectives of this study, thematic and descriptive analysis will be used to analyze and present the data collected.

3.4.1. Thematic Analysis

Due to the mixed methods nature of this research study, the thematic analysis technique was applied to the qualitative element of this research. According to Jones (2022), "thematic analysis is the method of producing themes from focus groups or interview transcripts so that responses to research objectives and questions can emerge" (Jones, 2022, p. 2). Thematic analysis will be employed in this study to explore patterns of awareness and knowledge of ES among students, based on interviews conducted on campus. I will code the interview transcripts and analyze the data to identify and present key recurring themes and patterns.

I began by transcribing the audio files from the interviews I conducted on campus, subsequently, I familiarized the transcribed interview scripts extensively by reading multiple times and writing notes on initial impressions, repeated patterns, and interesting observations. I conducted initial codes by highlighting meaningful segments and assigning short labels that described the essence of each segment. I examined the initial codes to broader categories (themes), by looking for relationships between codes and identifying overreaching patterns. After I identified the themes, I reviewed them to ensure coherence, uniqueness, and relevance to the research questions and make necessary adjustments. Finally, the findings were reported incorporating direct quotes and explanations to support each theme while linking the results to existing literature and themes.

3.4.2. Descriptive Analysis

Descriptive statistical tools such as Statistical Package for Social Sciences (SPSS) and Microsoft Excel were used for preprocessing and data analysis of the responses from the close-ended survey

administered to students. Data pre-processing involved rigorous data cleaning, coding, and organizing responses to ensure accuracy and consistency were achieved. Processed data was used in descriptive statistics techniques such as frequencies, descriptives, and cross-tabulation to identify any patterns and summarize key findings. The output was exported from SPSS output to Microsoft Excel where visualization was done using tables, bar graphs, column graphs, and pie charts for better presentation. After the descriptive statistics, results were interpreted and compared with existing literature.

3.5. Ethical Considerations

According to Nongqayi (2021), "ethical research is characterized by researchers who behave with integrity and who act in ways that are just, beneficent and respectful" (Nongqayi, 2021, p. 21). Participants were presented with a consent form and a participant information letter on the first page of the online questionnaire and at the beginning of the interviews. Here, the participants were made aware that their participation in the study is voluntary and confidential, and that they can withdraw at any point of the process. Their participation in the interviews and questionnaire survey was treated confidentially, and their identities remained anonymous. At any stage during the interview, I provided explanations to the participants when they required clarity on a question or concept. The participants received no compensation for participating in the research.

This research study complied with Wits University's ethical standards as I am a registered student at the university and will also be conducting the research study at the university. The researcher achieved ethical compliance by applying for ethical clearance with the Human Research Ethics Committee. The protocol number for this research study is **GAES-2024-75**.

3.6. Conclusion

This chapter provided a clear description of the methodological process that this research study undertook. The chapter provided a brief overview of the study area, and the research population would be extracted. A mixed methods approach was adopted in this research study in order to utilize a variety of approaches for collecting data from a large population and to allow for a generalization of the data findings to provide an in-depth understanding of the research problem being explored. To execute the stated research objectives and communicate with the participants, the research study used various data collection methods such as online questionnaires and interviews. Data analysis was conducted to interpret and discuss the responses from both the online questionnaires and the interviews. To achieve the objectives of this study, data analysis techniques such as thematic and descriptive analysis were used to analyze and present the data collected.

CHAPTER 4
STUDENTS' KNOWLEDGE AND AWARENESS

This chapter relates to the first objective of this research study, aimed at investigating students' knowledge and awareness of ES. To do this, the researcher conducted short interviews, using open-ended questions, with the participants on campus. The research findings and discussions in this chapter are divided into two sections according to the themes produced after the coding process. Section one presents the findings and discusses students' understanding of the concept of ES. Section two presents the findings and discusses students' sources of information that influence their awareness of ES.

4.1. Respondents' understanding of environmental sustainability

Question 1: What is your understanding of environmental sustainability?

The first question explores students' knowledge and understanding of ES. In response to this question, a majority of the respondents highlighted the importance of responsibly consuming and sustainably managing resources to secure their availability for both the current and future generations. Eight out of the ten students shared that "*ES is doing the best with the resources we have now and to continue to preserve these resources for future generations". In their response, some students made emphasis on "utilizing resources efficiently"*. One student emphasized this point, while also making mention of the 'tug-of-war' surrounding the sustainability approach in the economy, stating that:

"I think ES is efficiency in and of itself and I think it's an interesting nuance because a lot of the times in society we think that sustainability is an opposition to the economy and to progress, so for me, sustainability, in general, is efficiency because we're trying to minimize how much resources we use so that we can maximize the output in the future".

In addition to their responses, two respondents shared the potential for ES to address the environmental challenges currently being faced globally, sharing that: *"ES revolves around ensuring that issues like global warming, depletion of resources, and climate change issues are reduced and addressed and that resources are used sustainably".* One student expressed great passion in their response and shared their ethos on ES, sharing that: "*I have this thing that I go by which is: "one earth, a lot of people". It's a thing of being conscious that the resources that I'm using now, I'm sharing them with someone who isn't alive yet".*

4.1.1. Discussion

Recently, there has been a growing need to be more "aware and knowledgeable of the main topics of SD and sustainability especially in educational institutions and young adults" (Concina & Frate, 2023, p. 705). Research suggests that through being aware and engaging with topics surrounding SD and sustainability, individuals can develop positive attitudes and behaviors toward sustainability issues and challenges (Sadusky, 2014; Concina & Frate, 2023). As such, the respondents were asked to share their understanding of ES. This section discusses the key themes that emerged from the interviews. The key themes are discussed below:

4.1.1.1. Preservation of the future generation

When the respondents were asked if they understood the concept of ES, their responses revealed that they have a great degree of knowledge and understanding of ES. As part of their responses, the respondents highlighted the importance of responsibly and sustainably managing environmental resources to secure their availability for current and future generations. Phrases such as *"utilizing our resources efficiently"* and *"ensuring resources are preserved for future generations"* demonstrate the knowledge and understanding respondents have of ES. Another respondent shared an interesting personal ethos of ES on environmental consciousness which emphasized a shared duty, commitment, and awareness of sustainability.

4.1.1.2. Efficient resource use

The concept of efficiency also became a fundamental aspect when the respondents were defining ES, which they described as entailing the mindful use and restoration of resources. This response indicates that the respondents understand the concept of ES but also understand that to achieve ES it entails the mindful use and restoration of resources and relate this to reducing negative environmental impacts while maximizing resource efficiency for future generations.

4.1.1.3. Tackling environmental issues

The respondents were able to link ES to addressing the environmental challenges currently faced globally. These responses indicate that the respondents can recognize the role ES plays in tackling environmental issues and in providing sustainable solutions.

The responses from this section indicate that a majority of respondents have knowledge and understanding of ES. Similar results were found in a study by Nongqayi (2021) of student's awareness and knowledge of climate change, where a majority of the respondents displayed high levels of

knowledge and awareness of sustainability and climate change, and expressed an understanding of the concept of sustainability and climate change and as well as the impacts of sustainability-related issues. Owojori et al. (2022) suggest that this type of knowledge and awareness of ES exhibited by the respondents can enhance their attitudes and awareness of ES and in turn, lead to pro-environmental behaviors.

4.2. Respondents source of information on environmental sustainability

Question 2: What is your source of information about environmental sustainability? How has it helped you to be knowledgeable and aware of environmental sustainability and its related issues?

The second question explores students' awareness of ES by investigating their sources of information on ES, and how these sources of information help them to be more aware of ES and sustainability-related issues. In response to this question, three out of the ten students said that lectures and readings from their modules were their essential source of information with one of the students sharing that their readings and the lectures they attend *"have helped me become more aware of sustainability issues from a global scale and the potential solutions that can be put in place to address the impacts climate change and sustainability"*. Another student added that while their courses are their main source of information on ES, they think that most students won't feel the same way as modules on climate change and sustainability are *"not compulsory modules to take"* and goes on to share that *"during the first year, we had a climate change module that we had to take but I don't think most of the students took it or even attended the class".*

Four students said that their main source of information on ES was doing their research or reading on issues surrounding ES. One of the students shared that: *"doing my research and readings on ES has helped me be aware of sustainability and the approaches needed to change our current situation"*. Another student went on to share the reason why they prefer to do their research on ES: *"The thing that is interesting I think, is that most people get their information from mainstream media which I think has damaged what sustainability is for the reason that it's so sensationalized by the media".*

One student shared that they mostly get their information on ES from social media platforms such as Twitter (or X), sharing that that's where they are more exposed to *"information on environmental issues"* and that the more they engage with the topic of ES on the platform, the more *"it reinforces their need to conserve and preserve environmental resources"*. Four students said that podcasts are their main source of information on ES and shared that listening to podcasts has *"helped me realize that everything is related to the environment and the importance of ES in addressing some of the*

pressing environmental issues in society". One student shared a different source of information, stating: *"My major source of information has to be my upbringing in the village because we grow up knowing that we live alongside the environment and earth and so we need to take care of it so it can continue to take of us".*

4.2.1. Discussion

According to Concina & Frate (2023), "acquiring content and information about the most urgent themes related to sustainability, helps develop positive attitudes and awareness towards SD and sustainability" (Concina & Frate, 2023, p. 705). Thus, to investigate respondents' awareness of ES, the students were asked to provide their sources of information on ES, and how these sources of information help them to be more aware of ES and sustainability-related issues. This section discusses the key themes that emerged from the interviews. The key themes are discussed below:

4.2.1.1. Independent research and online media

A majority of the respondents shared that doing independent research and online media such as YouTube, podcasts and social media platforms like Twitter (or X) were their main sources of information on ES. This should come as no surprise as we live in a digital era where information online is easily accessible. According to Nongqayi (2021), social media is increasingly becoming a tool for engaging with a variety of topics and driving awareness of environmental issues plaguing the global community. Some students were of the idea that sustainability is highly sensationalized by mainstream media, and so for them to get unbiased information on ES, they prefer to do their reading and research on ES. The students said that this helped them *"become more aware of ES and the approaches needed to change our current situation"*. This shows that the students are actively exploring and taking the initiative to learn more and grow their awareness of ES issues facing society.

4.2.1.2. Traditional/Formal education

Most of the respondents shared that lecturers and academic modules/courses were their essential source of information on ES, sharing that it has helped them grow aware of ES and its related issues and how it affects society. Researchers attribute this to the fact that formal education not only contributes to promoting SD values but it's also where critical thinking and learning are promoted and encouraged (Concina & Frate, 2023). However, some respondents also observed that these modules were not compulsory which they believe restricts students' access to sustainability education.

4.2.1.3. Cultural and personal experiences

For some of the respondents, ES awareness was rooted in their upbringing and personal/cultural experience. This response highlights the researcher's notion that an individual's socio-economic background and cultural and social norms shape their outlook, behaviors, and awareness of the environment and sustainability, as they foster an early/mutual understanding and value of the environment and the importance of living harmoniously with nature (Sadusky, 2014; Starovoytoya & Namango, 2018; Dlamini et al., 2021). Furthermore, this response is in line with Nongqayi's (2021) findings stating that this cultural knowledge and awareness is attributed to the respondents' experience with nature, environmental consciousness, and awareness.

4.3. Conclusion

The results from this chapter are clear and illustrate that students from Wits University are well-informed, aware, and knowledgeable of ES. The results indicate that not only do students understand ES but are also able to recognize the role ES plays in addressing society's most pressing environmental issues sustainably. This chapter further explored students' awareness of ES in terms of the sources of information that they utilize and engage with and that expose them to themes/topics surrounding ES. The results from this study show that there are a variety of sources that students use to acquire content and information on ES. Furthermore, this study suggests that the students are engaging with the topics surrounding ES irrespective of the type of source of information they use which is very encouraging to note. A majority of the students referred to online media such as podcasts, YouTube and social media platforms as their main source of information. This is not surprising as we live in a digital age where everything is easily accessible to everyone, especially young people. Students also mentioned traditional/formal education at universities as their source of information. This reiterates the notion made by researchers that through formal education, students are not only able to acquire information relating to SD and sustainability but are also able to critically think and learn about issues and challenges surrounding SD and sustainability. Despite the various sources of information mentioned in the results, it is crucial to note that through these sources of information- be it debates or lectures on campus, podcasts, or social media networks, there is socialization and discussions that students are engaging in regarding ES. These very tools can be used to reach students and bring about awareness of ES.

CHAPTER 5
ATTITUDES AND PERCEPTIONS OF ENVIRONMENTAL SUSTAINABILITY

This chapter relates to the second objective of this research study, aimed at understanding students' attitudes and perceptions toward ES on campus. To do this, the researcher conducted an online questionnaire survey, using Likert scales and closed-ended questions, that was distributed to participants via student email. This chapter provides the research findings and discussions from sections one, two, three, and four of the questionnaire survey. The research findings and discussions in this chapter are divided into two sections. Section one discusses students' concerns and attitudes toward ES on campus, while section two discusses students' perceptions of ES on campus.

It is evident in the previous chapter that students have a clear understanding and awareness of the concept of ES, however, research has shown that attitudes and perceptions are key to understanding and unpacking students' knowledge and awareness. Thus, this chapter offers a clear image of students' attitudes and perceptions toward ES on campus.

5.1. Attitudes toward environmental sustainability on campus

5.1.1. Students' concern toward environmental sustainability

This section asked respondents to indicate their understanding of sustainability to assess students' concerns toward ES. Haque et al. (2023) state that doing this is crucial as it can help one understand how students view the environment and sustainability and their involvement in it. **Figure 3** illustrates students' concern for ES The respondents were asked to indicate who they think should be responsible for safeguarding the environment and its resources (ES). A majority of respondents (89%) thought that it was "everyone's" responsibility, while 6% felt it was the "government's" responsibility and only 2% felt the "youth" should hold the responsibility. Therefore, this indicates that students have a positive concern for the environment and that everyone in the campus community and society has the power to make positive changes to the environment. Similar findings have been found elsewhere. For example, Haque et al. (2023) found that most students from three universities in Bangladesh said that ES is the concern of everyone and not just campus authority. A possible reason that 6% of the respondents feel that government is responsible for ES could be attributed to the fact that a large proportion of society still views "government as the sole entity that is responsible for addressing

environmental issues and does not consider their contributions" (Mapatagane, 2020, p.13). Thus, more needs to be done to change and encourage an individual's environmental actions and behaviors so the responsibility to protect the environment shifts from solely government to everyone in society.

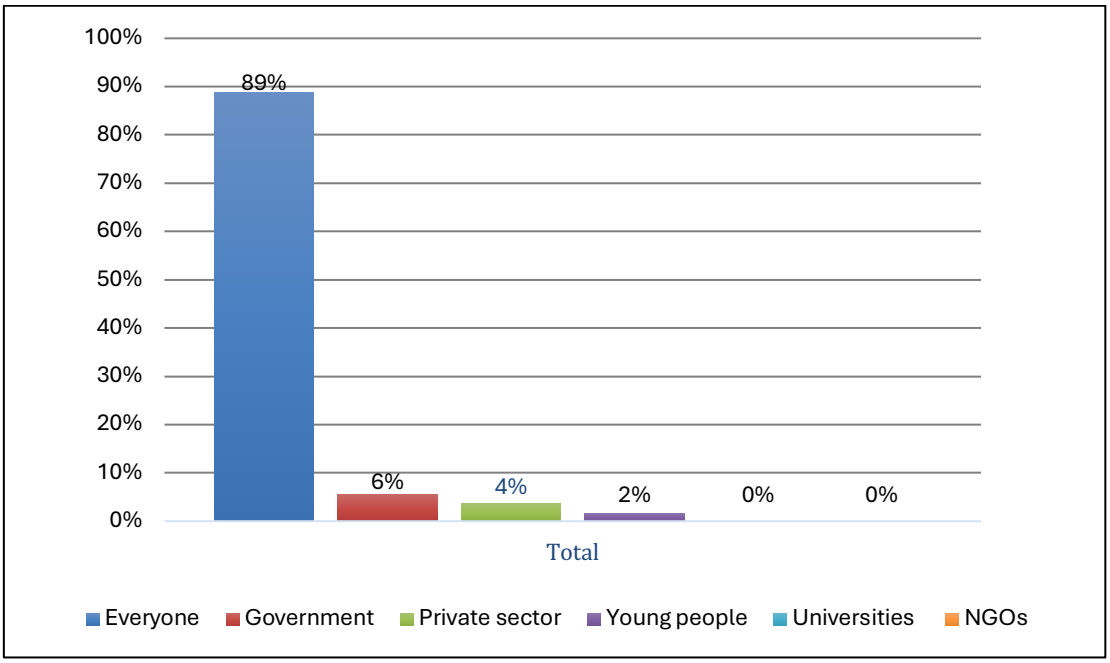


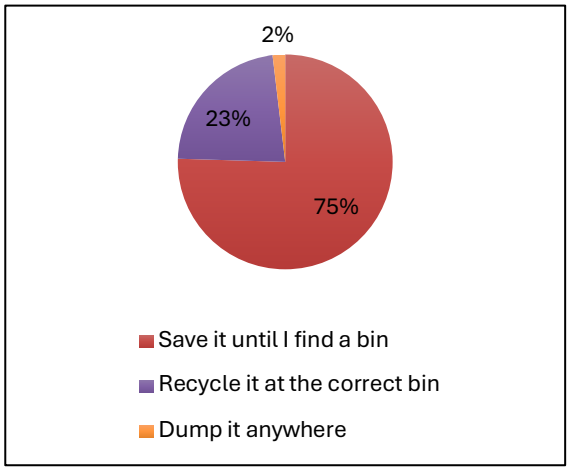
Figure 3. Students' concern for environmental sustainability.

5.1.2. Students' attitudes toward environmental sustainability

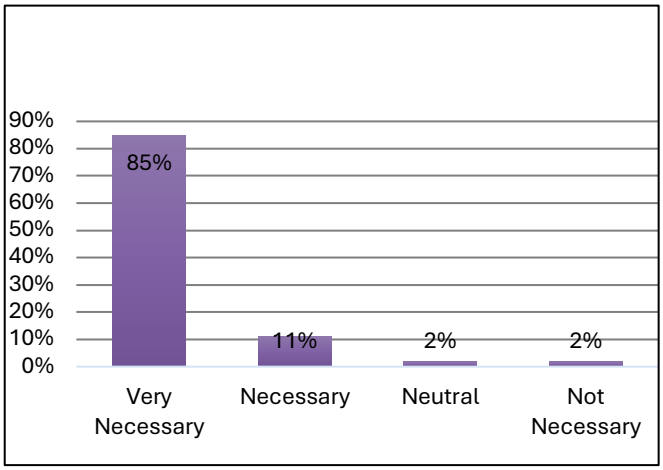
An individual's values toward sustainability or environmental issues are signified through attitudes that have a powerful influence over an individual's behaviors, beliefs, emotions, and values (Syed Azhar et al., 2020). To examine the students' attitudes toward ES, the respondents were asked a couple of questions to elicit their basic understanding and view of ES (outside of the campus setting) (**Figure 4**). This is vital as it contains information regarding student's general views, lifestyle, and behavioral choices.

In **Figure 4(a),** respondents were asked what their preference was after using a packet of chips or a juice bottle/can. A majority of respondents (75%) said they "save the packet of chips or juice can until they find a bin", 23% of the respondents said they prefer to "recycle it at the correct bin" and a small percentage (2%) said they "dump their waste anywhere". This indicates that a majority of students practice good waste management and recycling habits and are generally environmentally conscious of their actions. In **Figure 4(b)**, respondents were asked what their view was on the preservation of the natural environment and its resources. A majority of respondents (85%) were of the view that it was

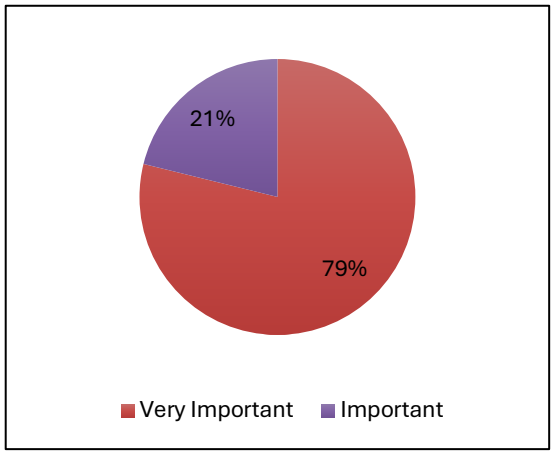
"very necessary" to preserve the natural environment and its resources while a small percentage (2%) said that it was "not necessary" to do so. Lastly, respondents were asked whether they view sustainability as important to them (**Figure 4(c)**). All the respondents agreed, with most respondents (79%) saying that sustainability was "very important" to them while only 21% of the respondents said that it was "important" to them. All three of these findings are very encouraging as they suggest that students exhibit general positive views, attitudes, values, and behaviors toward ES. According to Shi et al. (2016), this should come as no surprise as a heightened concern for the environment (which is illustrated in the previous chapter) is closely related to high levels of knowledge and awareness of sustainability-related issues and pro-environmental behaviors. Thus, investing in ES awareness is crucial.



(a)



(b)



(c)

Figure 4. (a) Students' waste disposal habits; (b) Students' view on the preservation of the environment; (c) Students' view on the importance of sustainability.

In this section, respondents were further asked a series of questions to gauge their level of attitude towards ES on campus. This section is important as it may assist the researcher in understanding how involved and aware the university and its students are of sustainable practices and initiatives (Haque et al., 2023, Syed Azhar et al., 2022). Several items were used to examine respondents' attitudes toward ES. A standard interpretative scale was utilized to assess the respondent's positive attitude toward ES, where a mean of 1.00-1.79 and 1.80-2.59 represent low, 2.60-3.39 represents moderate, and 3.40-4.19 and 4.20-5.00 represent high. In terms of the respondent's attitudes, the results of the mean analysis show that students have a low or negative attitude toward ES, with an overall mean score of 2.56.

When respondents were asked whether their decision to enroll at Wits University was influenced by the university's sustainability programs, the results had a moderate mean value of 3.36. This is the highest mean value of respondent's attitudes toward ES. Meanwhile, respondents' attitudes to the question relating to whether they feel they can contribute towards an environmentally friendly/sustainable campus had a low mean value of 1.89. Furthermore, respondents' attitudes on whether Wits University encourages their participation in campus sustainability initiatives also had a low mean value of 2.36. Finally, on the matter of whether the respondents are aware of sustainability initiatives available on campus, the mean value was moderate at 2.64. **Table 3** presents a summary of the mean analysis findings.

Table 3. Mean analysis of respondents' attitude towards environmental sustainability on campus.

Item	Mean	Interpretation
1. When deciding to enroll at Wits University, I was influenced by the university's sustainability programmes.	3.36	Moderate
2. I can contribute towards an environmentally friendly/sustainable campus.	1.89	Low
3. Wits University encourages participation in sustainability efforts on campus.	2.36	Low
4. I am aware of sustainability initiatives available on campus.	2.64	Moderate

Overall, the findings in Table 3 indicate a low or negative mean score, indicating that students at Wits University have a negative attitude toward ES on campus. These negative results contradict the findings from Balakrishnan et al. (2020) study which aimed to gauge the attitudes and perceptions of undergraduate students at five universities in Malaysia toward SD. Balakrishnan et al. (2020) found that undergraduate students exhibited positive attitudes toward SD because HEIs in Malaysia promote the education and awareness of sustainability challenges among its students. Based on the results of this study, the researcher can suggest that the negative attitude toward ES could be attributed to Wits University's lack of action in promoting a sustainability culture on campus and awareness raising of sustainability initiatives available on campus. Sadusky (2014) acknowledges that it is crucial that "sustainability become part of the culture at universities to be routine, which is only achieved with high levels of action and involvement" (Sadusky, 2014, p.3). In a similar study that focused on learners' awareness and perception of climate change in high schools in South Africa, Nongqayi (2020) notes the importance of sustainability education as a tool for raising awareness and knowledge of sustainability which can assist in evoking a sense of responsibility in students for safeguarding the environment and a sense of power that they can be part of the solution to environmental issues.

Regarding respondents' attitudes toward ES on campus (**Figure 5**), findings from item 1 show that a majority of respondents (40%) are "uncertain" whether they were influenced by Wits University's sustainability programs when deciding to enroll at the university. This indicates that Wits University's sustainability initiatives and programs have not reached a wider audience beyond the campus population. Contrary to the findings from this study, a study of student's attitudes and perceptions toward sustainability at the University of Sains Malaysia by Syed Azhar et al. (2020), found that a majority of students were influenced by the university's sustainability programs when deciding to enroll at the university. In terms of item 2 (**Figure 5**), the study found that most respondents (47% and 38%) don't believe that they can contribute to an environmentally friendly campus, with 47% of the respondents "strongly disagreeing" and 38% of the respondents "disagreeing" with the statement, which is alarming. This indicates a lack of involvement and engagement of students regarding sustainability initiatives on campus. Similar findings have been found elsewhere. For instance, Haque et al. (2023) found that most students from three universities in Bangladesh don't contribute to creating a sustainable campus.

Furthermore, in item 3 (**Figure 5**), respondents were asked to indicate whether Wits University encourages their participation in sustainability efforts on campus. It was observed that most of the respondents "disagreed" (57%) with the statement in item 3, while only a small proportion (6%) "agreed" with this statement. Based on the poor findings observed in item 2, these findings should come as no surprise. Both these findings are indicative of students' lack of exposure to ES on campus which has resulted in students' negative attitudes. This observation is in line with that of Syed Azhar et al. (2020) as they acknowledge that without positive exposure to ES and the environment, it is not possible to change students' attitudes and behaviors toward ES on campus.

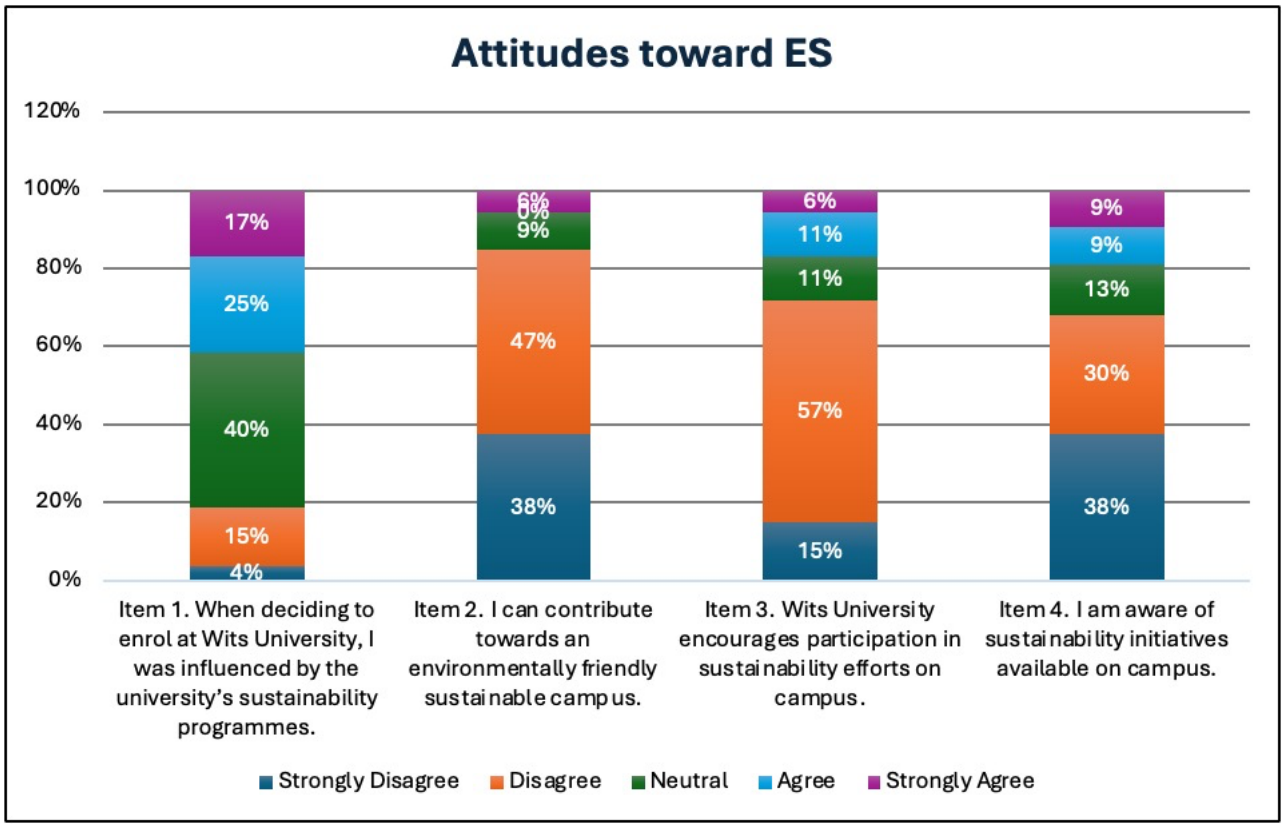


Figure 5. Respondent's attitudes toward environmental sustainability.

Lastly, item 4 (**Figure 5**) shows that most respondents (38% and 30%) agree that they are not aware of sustainability initiatives available on campus, with 38% of the respondents "strongly disagreeing" and 30% "disagreeing" with the statement. While it may be encouraging to note that a majority of the students at Wits University have a positive general view, understanding, behavior, and values toward ES, the lack of awareness and promotion of ES by campus management and a lack of involvement of students in sustainability initiatives and programs on campus limits the student's ability to put those positive actions into practice on campus and to cultivate new ones. A similar study that focused on college students' behaviors and perceptions toward sustainability at Florida State University by Sadusky (2014) revealed that while students at the university exhibited pro-environmental behaviors and commitment to sustainability, a majority of students were not aware of the sustainability programs available on campus, thus restricting students' associated actions.

It is important to note that attitudes are not fixed but can be changed through positive experiences and exposures. For instance, because attitudes are related to an individual's degree of experience and exposure to something, as noted by Syed Azhar et al. (2020) and Haque et al. (2023), students' attitudes toward ES and environmental issues can be changed. Therefore, through increased positive experiences and exposure to ES such as environmental education and awareness campaigns,

researchers are of the view that students can develop a deep sense of responsibility and involvement in the well-being of the environment (Sadusky, 2014; Syed Azhar et al., 2020; Haque et al., 2023). This suggests the need for Wits University to adopt outreach programs that create awareness, engagement, and participation in ES initiatives available on campus.

5.2. Perceptions toward environmental sustainability on campus

According to Syed Azhar et al. (2020), perception "plays an important role in influencing human attitudes and behaviors toward a particular object or situation" (Syed Azhar et al., 2020, p.10), thus, an in-depth understanding of students' opinions, experience and behaviors of ES on campus is crucial as it indicates how effective the sustainability programs and initiatives are and the steps that could potentially be taken to improve the current program for everyone on campus.

To examine the students' perceptions toward ES, the respondents were asked a series of questions to elicit their basic understanding of ES (**Figure 6**). In **Figure 6(a)**, respondents were asked how important it is to them to adopt positive environmental behaviors and practices. A majority of respondents (91%) said it was "very important" while only a small percentage (2%) said they were "uncertain". This indicates that students not only engage in pro-environmental behaviors, but they also know the impacts of their actions and how this affects future generations. In **Figure 6(b)**, respondents were asked how knowledgeable they consider themselves to be regarding sustainability-related issues. Most respondents (43%) said they were "very knowledgeable" about sustainability-related issues while 11% of the respondents said they were "somewhat knowledgeable". Lastly, respondents were asked how important it is to them to work at a company that contributes positively to the environment and society (**Figure 6(c)**). A majority of respondents (72%) said it is "very important" for them to work in environmentally sustainable companies while only 2% of respondents were "uncertain" of this statement. All three of these findings are very encouraging as they suggest that students exhibit general positive views, perceptions, and behaviors toward ES. Meadows (2020) stresses the need to be knowledgeable and aware of an issue to be able to engage with it. Researchers further highlight that an important forecaster of an individual's commitment, behavior, and intention to specific issues (such as ES) stems from their understanding of those issues (Findler & Schönherr, 2019; Nongqayi, 2020). This is evident from the respondents' responses as they considered themselves very knowledgeable on sustainability issues and because of this knowledge and understanding of sustainability they not only engage in pro-environmental behaviours and practices, but they are also environmentally conscious of the choices they make in the future as a majority of the respondents stated that it is very important for them to work in environmentally sustainable companies. Therefore, it is crucial to invest in

environmental awareness to continue to cultivate these positive behaviors, perceptions, and actions on campus.

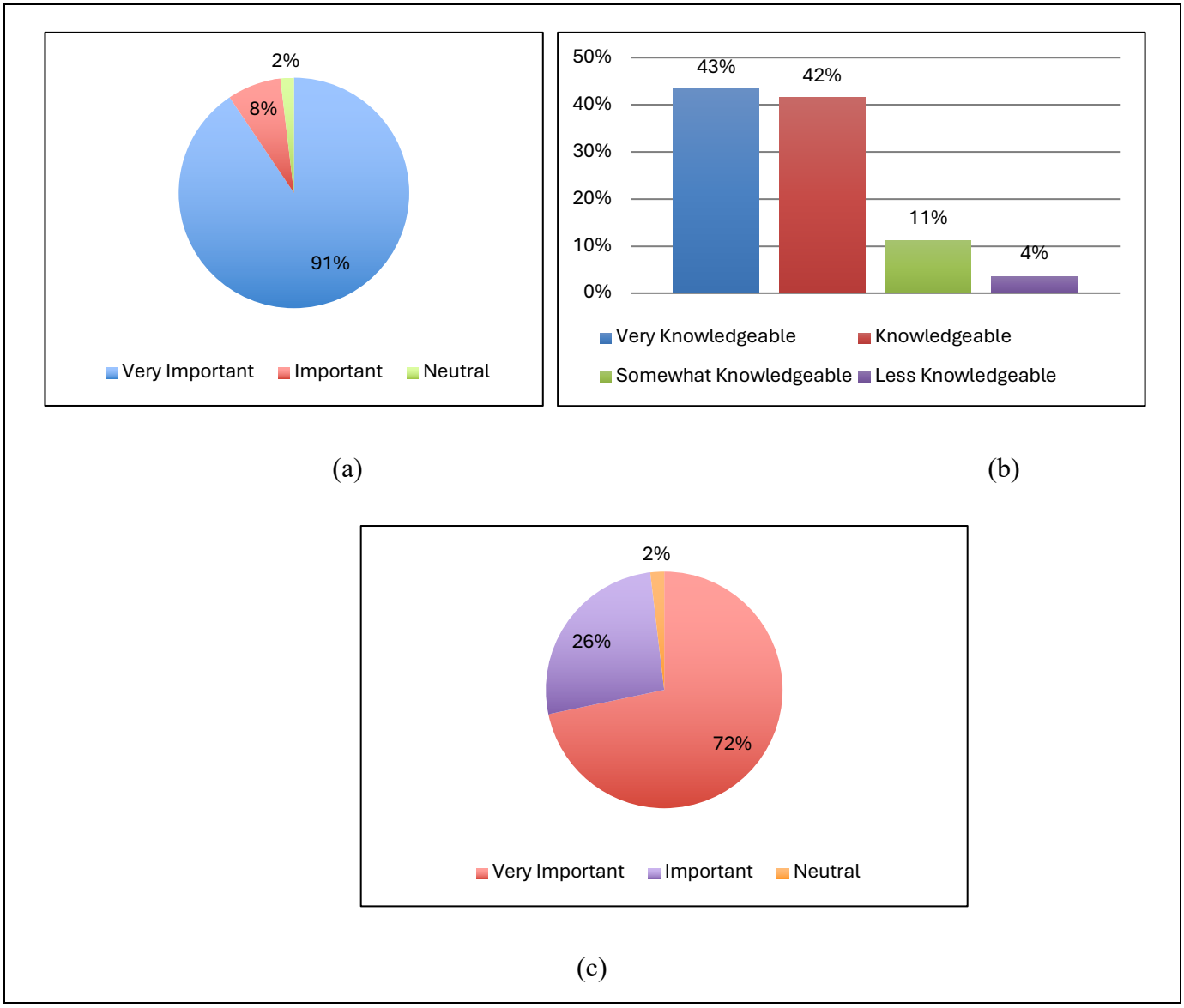


Figure 6. (a) Students' view on adopting pro-environmental behaviors and practices; (b) Students' view on sustainability-related issues; (c) Students' view on working at an environmentally conscious company/organization.

By incorporating environmental education into the university's pedagogy system, universities can educate their students to find solutions to environmental and sustainability issues plaguing society (Abubakar et al., 2016). As such, respondents were further given a series of statements to gauge their level of perception toward ES on campus. This section is vital to understanding the opinions, perceptions, and behaviors of students regarding ES on campus. Several items were used to examine respondents' perceptions of ES. A standard interpretative scale was utilized to assess the respondent's

positive perception toward ES, where a mean of 1.00-1.79 and 1.80-2.59 represent low, 2.60-3.39 represents moderate, and 3.40-4.19 and 4.20-5.00 represent high. In terms of the respondent's attitudes, the results of the mean analysis show that students have a moderate perception of ES, with an overall mean score of 2.74.

When the respondents were asked whether their modules/courses have encouraged them to think and act in an environmentally friendly manner, the results had a low mean value of 1.57. This is the lowest mean value of respondents' perceptions toward ES. Respondent's perception of the question relating to seeing marketing or awareness advertisements/posters regarding sustainable practices and initiatives available on campus had a moderate mean value of 2.89. Meanwhile, respondents were asked whether their modules required a sustainability element, the results had a high mean value of 4.13. Lastly, on the matter of whether their lecturers have integrated SD and sustainability well in their modules, the mean value was low at 2.40. Table 4 presents a summary of the mean analysis findings.

Table 4. Mean analysis of respondents' perceptions toward environmental sustainability on campus.

Item	**Mean**	**Interpretation**
1. My courses have encouraged me to think and act in an environmentally friendly manner.	1.57	Low
2. I don't see marketing ads about sustainable practices and programs available on campus.	2.89	Moderate
3. My course does not require a sustainability element.	4.13	High
4. All my lecturers at Wits University have integrated sustainable development and sustainability issues well in my subjects.	2.40	Low

Overall, the findings in Table 3 indicate a moderate or uncertain perception of ES on campus. These results are similar to the findings from a study by Thondhlana & Nkosi (2024), which aimed to examine

both students' and staff's awareness and perceptions of sustainability on campus at Rhodes University in South Africa. Thondhlana & Nkosi (2024) found that there were low levels of awareness and perceptions from both stakeholders. The study cited a lack of cooperation, funding, and commitment from top management in raising awareness and instilling a culture of sustainability on campus as some of the reasons for the low results. However, the results from this study and Thondhlana & Nkosi's (2024) study contradict the findings from Syed Azhar et al. (2022). The results from their study indicate that sustainability is positively perceived among Malaysian undergraduate students. Based on the results of this study, the researcher can suggest that the moderate or uncertain perceptions toward ES could be attributed to a lack of awareness, the culture of sustainability, and the promotion of sustainability through academic programs and sustainability practices on campus. This indicates that more improvements need to be made in the academic programs and overall promotion and awareness of sustainability practices and initiatives on campus to ensure a positive experience for the students and increased exposure to sustainability practices on campus.

In the context of respondents' perception of ES on campus (**Figure 6**), respondents were asked whether their courses encourage them to think and act in an environmentally friendly manner. Most respondents (64%) "strongly disagreed" with this statement while a small percentage (4%) said they "strongly agreed", which is alarming and unfortunate as previous studies show that environmental studies and research tend to encourage sustainability among students or individuals (Stek & Vleg, 2009, Concina & Frate, 2023). In terms of item 2 (**Figure 6**), this study found that most respondents (40%) were "uncertain" whether they see marketing ads about sustainable practices and programs available on campus, while 23% of the respondents said they "agree" that they don't see marketing ads around campus. Similar results were found in a study by Syed Azhar et al. (2020) where a majority of students were "uncertain" whether they see advertisements of sustainability programs and practices on campus. According to Sadusky (2014), adopting awareness and marketing techniques can influence an individual's pro-environmental behaviors and perceptions and thus, encourage sustainability among students.

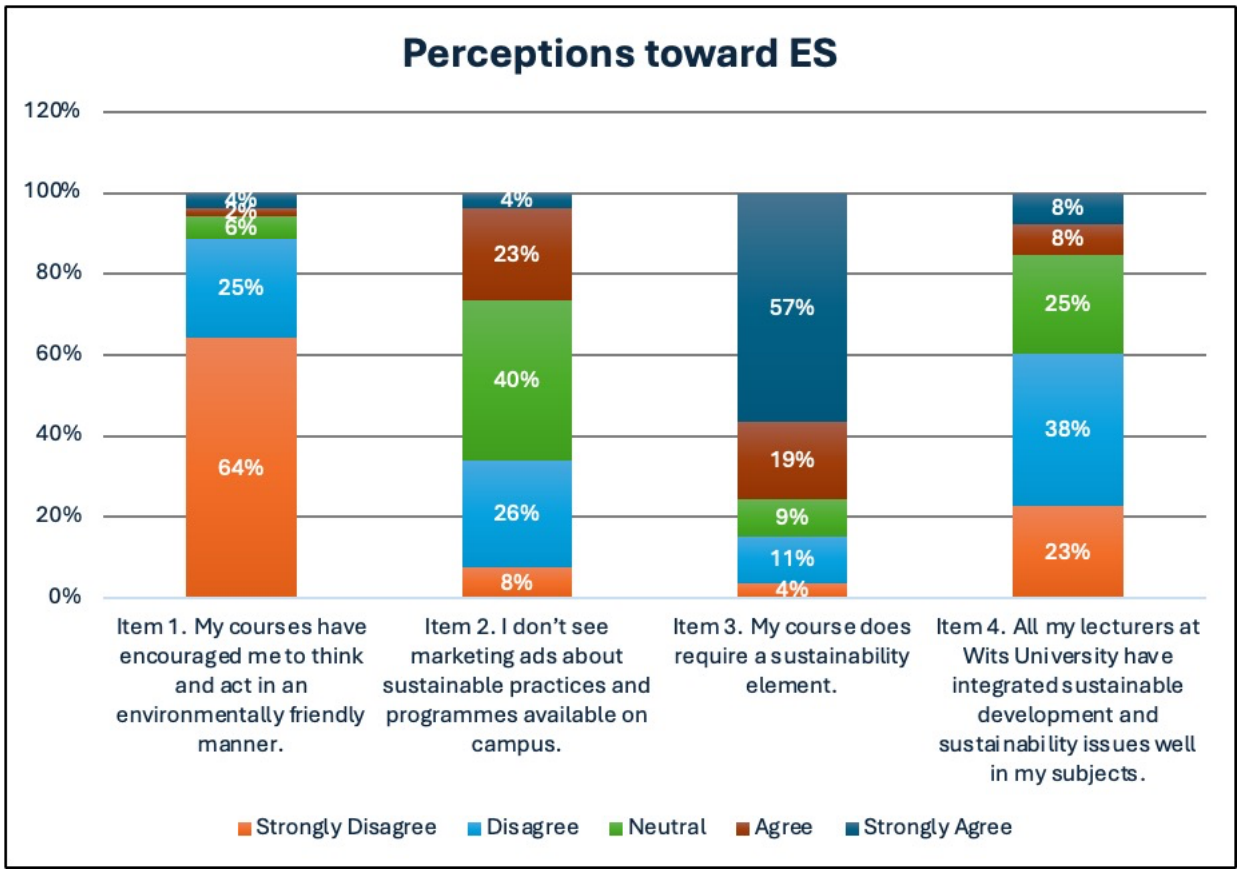


Figure 7. Respondent's perceptions toward environmental sustainability.

Furthermore, the findings observed from item 3 (**Figure 6**) indicate that a majority of respondents (57%) strongly feel that their courses require a sustainability element while a small percentage (4%) "strongly disagreed" with this statement. These findings are very encouraging and suggest that students want to learn more about sustainability. Alvarez-Nieto et al. (2022) also found similar results in their study of nursing students' attitudes and awareness of sustainability and climate change in various countries. The findings from their study revealed that nursing students are aware of sustainability and climate change issues and that they value the integration of sustainability into their academic curriculum. Lastly, item 4 (**Figure 6**) shows that most of the respondents (38%) "strongly agree" that their lecturers at Wits University have not integrated SD and sustainability issues well in their subjects while a small percentage of respondents (8%) "don't agree" with this statement. These findings suggest that Wits University's (and the School of GAES) academic program needs to be modified to not only include additional courses that emphasize sustainability but also restructure the course in such a way that they are delivered in a more interactive and engaging approach. By doing so, the university can produce educated and informed individuals who will be able to "carry out informed sustainability decisions that would affect the entire society" (Abubakar et al., 2016, p.9). A study by Abubakar et al.

(2016) on students' evaluation of campus sustainability at the University of Dammam in Saudi Arabia found that most students don't think that sustainability has been integrated enough into their academic programs. Research suggests that even one course that utilizes an inquiry-based approach and that promotes active learning can be successful in improving students' perceptions of sustainability (Zeegers & Clark, 2014; Abubakar et al., 2016).

5.3. Conclusion

This chapter sought to investigate and understand students' attitudes and perceptions toward ES on campus. The findings in this chapter focused on two main elements: students' attitudes and their perceptions. Before delving into each of the elements and the findings for each, the study briefly explored students' basic understanding of ES to set the foundation or baseline for students' knowledge, behaviors, views, and awareness of ES. The results from this short section revealed that the students have positive views, concerns, behaviors, and awareness of ES and value safeguarding the environment and its resources. The study then went on to investigate students' attitudes and perceptions towards ES on campus, focusing on students' awareness, perceptions, and attitudes of ES on campus through sustainability campus initiatives and academic programs on campus. The results revealed that students at Wits University have low to moderate, or negative, attitudes and perceptions towards ES on campus, attributing this to a lack of awareness and involvement in green campus initiatives and a lack of engaging academic programs that include sustainability, to name a few. This is a key issue that further research would have to unpack and interrogate deeply. Thus, despite the results revealing that the students have positive views, concerns, behaviors, and awareness of ES, they exhibited negative attitudes and perceptions of ES on campus.

CHAPTER 6
FACTORS INFLUENCING STUDENTS' DECISION TO ACT SUSTAINABLY

This chapter relates to the third objective of this research study, aimed at understanding the factors that influence students' decisions to act sustainably. To do this, the researcher conducted an online questionnaire survey, using Likert scales, that was distributed to participants via student email. This chapter provides the research findings and discussions from sections five, six, and seven of the questionnaire survey which include understanding what are some of the factors that influence students to act sustainably, understanding the types of sustainable and environmentally friendly practices students engage in on campus and in their daily lives, and the willingness of students to participate in sustainability initiatives on campus.

It is evident in the previous chapters that while the students have a clear general understanding, knowledge, and awareness of ES, they lack positive attitudes and perceptions toward ES on campus. Research states that for university programs, policies, and initiatives to be successful, they require the buy-in of their key stakeholders- students (Ekka et al., 2022; Dabija et al., 2023; Pedro et al., 2023). Thus, this chapter seeks to not only understand the factors influencing students' decisions to act sustainably but also to investigate the willingness of students to participate in sustainability initiatives on campus.

6.1. Students' environmentally friendly practices

This section sought to investigate which environmentally friendly practices respondents perform daily. The findings shown in Figure 7 are based on multiple-choice questions that allowed the respondents to choose more than one response. Figure 7 revealed that most of the respondents (40%) practice "energy conservation", 28% of the respondents practice "recycling" and 19% of the respondents said they practice "water conservation". Similar results were found in Eagle et al.'s (2015) study of undergraduate business students' attitudes towards sustainability at James Cook University in Australia. The study reported that a majority of students practice switching off lights and using environmentally friendly light bulbs (energy conservation). A possible reason for the high practice of energy and water conservation in this study could be attributed to the fact that Johannesburg is currently experiencing load shedding and water shedding, which encouraged people to be more conscious of how they use their energy and water and to practice sustainable measures that can help conserve these vital resources.

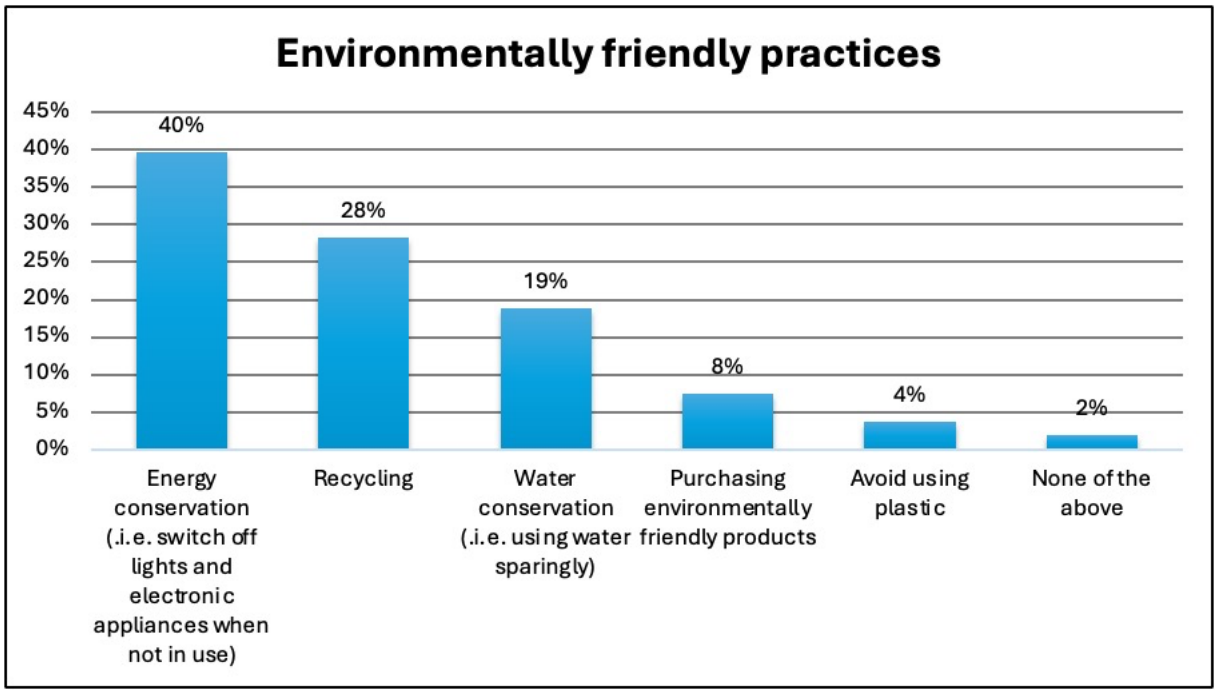


Figure 8. Students' environmentally friendly practices.

6.2. Factors influencing students' decision to act sustainably

Understanding and embracing norms, beliefs, and values can assist universities in promoting campus sustainability, increasing environmental awareness, and assist campus managers in adapting and improving sustainability strategies and programs to reflect the needs of students (Sadusky, 2014; Mbewe, 2016, Thondhlana & Nkosi, 2024). As such, this section investigates the factors influencing respondents' decision to act sustainably. The results in **Figure 8** reveal that a majority of respondents (45%) are influenced by their "personal concern for the environment", 17% of the respondents are influenced by "courses taught on campus" and 14% of the respondents said they are influenced by "sustainability programs and initiatives on campus". Similar results were found in Thondhlana & Nkosi's (2024) study where they found that a majority of students at Rhodes University were influenced by their concern for the environment for their reasons in pursuing sustainability on campus, suggesting that more needs to be done to raise awareness and encourage students to act sustainably.

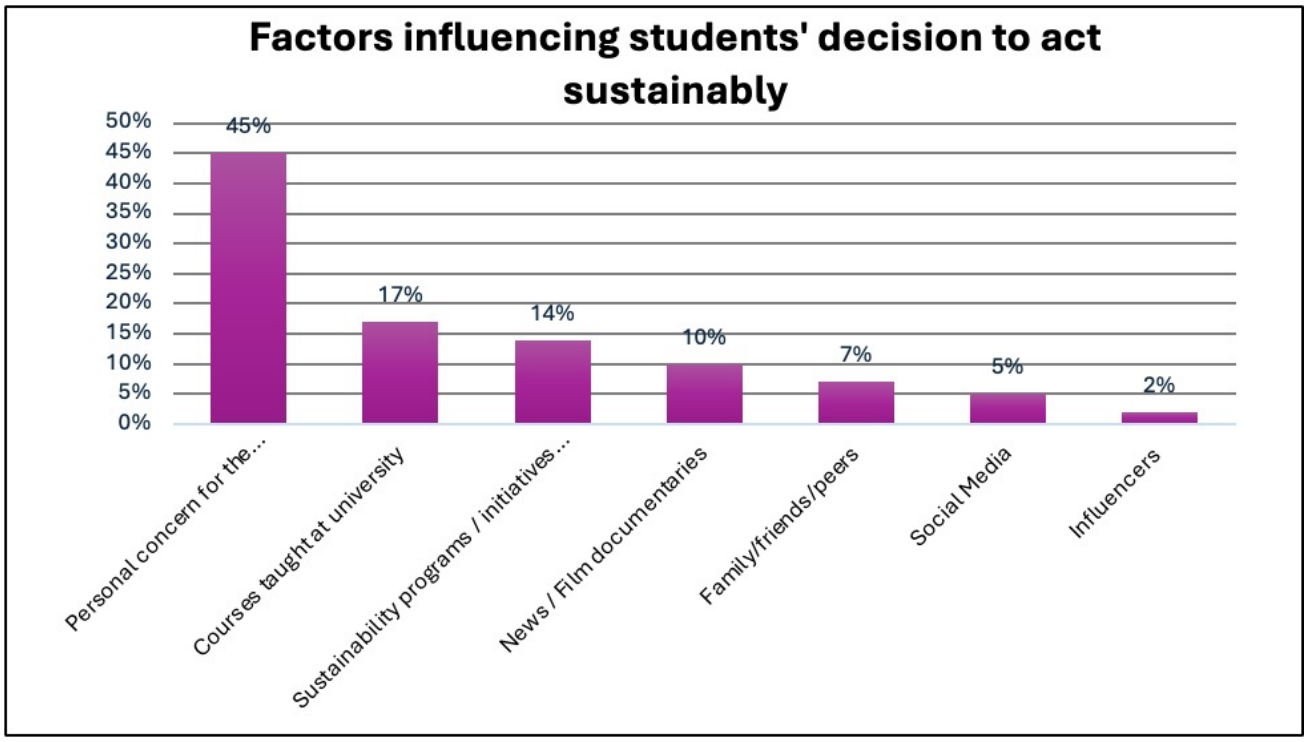


Figure 9. Factors influencing students' decision to act sustainably.

6.3. Students' likelihood to participate in sustainability initiatives on campus

Respondents were asked about the likelihood of them participating in sustainability initiatives on campus. **Figure 9** shows that a majority of respondents (66%) are "very likely" to participate in campus sustainability initiatives, while 9% of the respondents were "uncertain" whether they would participate in campus sustainability initiatives.

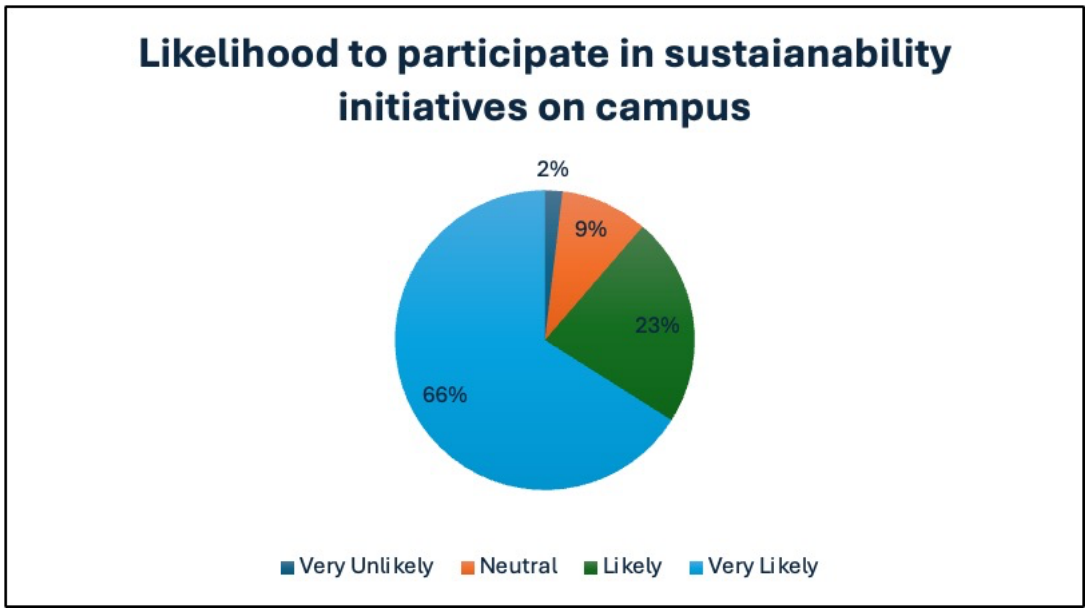


Figure 10. Students' likelihood to participate in sustainability initiatives on campus.

Contrary to the findings of this study, a comparative study by Haque et al. (2023) reported that most students from three universities in Bangladesh are unwilling to participate in sustainability initiatives and activities on campus. Haque et al.'s (2023) findings are similar to a study by Abubakar et al. (2016) where they reported that most students at the University of Dammam in Saudi Arabia were not willing to participate in sustainability initiatives on campus.

6.4. Conclusion

In this chapter, the study sought to investigate the factors that influence students' decision to act sustainably. This chapter's findings revealed that students engage in a range of sustainability practices and are willing to participate in sustainability initiatives or programs on campus, which is very encouraging. The study also revealed that among a variety of factors influencing students' decision to act sustainably, personal concern for the environment was rated high. These results indicate that students have a positive outlook on the environment and pro-environmental behaviors. However, I do note that this section of the research study could have interrogated the barriers or challenges that hinder students from participating in sustainability issues, as this could have painted a more in-depth picture of not only the factors that influence them to act sustainably but also the barriers or challenges, as these go hand in hand if change is to be instructed. This research study only considered students' attitudes and perceptions, but more factors, such as barriers affecting students from participating in ES initiatives on campus, can be explored.

CHAPTER 7
CONCLUSION

This concluding chapter presents the limitations, a summary of the findings, and discussion points. The chapter commences by presenting the limitations of the study, followed by a summary of the results linked to each of the objectives. Based on these concluding findings, recommendations are presented for future research.

7.1. Limitations

Each research study is confronted with a variety of limitations. For this research study, one of the limitations was the lack of responses from participants as the questionnaires were distributed via student email. With an increased influx of emails being sent to their emails, this could have flooded the participant's inbox causing them to overlook the request to participate in the questionnaire survey. Furthermore, this research study faced time constraint challenges as the data collection process was limited to a month to reach out to participants before they started their exams. Conducting data collection during the exam/assessment period contributed to the low questionnaire and interview turnout by participants. This limitation could also have contributed to the lack of participation in the questionnaire as students might have been focused on preparing for their exams and were not attending to their emails during that time. Another limitation of this research study is that it would have been useful to triangulate the research results with information about present (or absent) campaigns and course content at Wits University, so as to better assess the formation of these perceptions and formulate further recommendations accordingly.

7.2. Summary of the findings

This research study aimed to investigate the attitudes and perceptions toward ES among students at Wits University. Observations from this study revealed that the respondents displayed great knowledge of ES, as they were able to define and show an understanding of ES and sustainability. The ability of the respondents to explain the concept of ES is in line with Nonqayi's (2021) findings stating that this knowledge and awareness is attributed to the respondents' experience with nature, environmental consciousness, and awareness. Observations also revealed that the respondents were aware of ES and shared some sources of information that helped bring awareness to the related issues surrounding ES and sustainability. There were notable differences in the sources of information as some of the respondents said that lecturers and academic courses provided them with awareness of ES while other

respondents shared that it was online sources such as podcasts, social media platforms, and YouTube that provided them with a majority of their information on ES topics and issues.

Observations from this study also revealed that students have a general positive concern, view, behavior, and awareness toward the environment and an understanding of ES. The ability of the respondents to display concern for the environment is in line with Shi et al.'s (2016) findings where they state that an individual's high concern for the environment is closely related to their high levels of knowledge and awareness of sustainability-related issues and pro-environmental behaviours. A noteworthy finding is that while there is substantial knowledge and concern for ES among students, the study found that the respondents' attitudes and perceptions of ES on campus ranged from low to moderate, indicating students' negative attitudes and perceptions toward ES on campus. This is supported by the fact that while students exhibit awareness of ES and sustainability-related issues, and believe that achieving ES is everyone's responsibility, they lack involvement in campus sustainability practices and feel there is a lack of promotion of campus sustainability as they are not aware of sustainability programs and practices available on campus and that the university does not encourage their participation in sustainability efforts on campus. Furthermore, a majority of students don't believe that they can contribute to an environmentally friendly campus.

Regarding the curriculum, the respondents were largely of the opinion that SD and sustainability issues were not integrated well into their courses and went on to state that their courses have not encouraged them to think and act sustainably. However, it was encouraging to note that the respondents believe that their courses do require a sustainability element. This study also revealed that the students were mostly influenced by their concern for the environment as a reason for acting sustainably. It is encouraging to note that despite the negative attitudes and perceptions of students toward ES on campus, the students are willing to participate in ES on campus. Therefore,

7.3. Discussion points

The following discussion points emerged from this research study and are provided below as suggestions or recommendations that are tied to the conclusions drawn from this research study:

7.3.1. Reorientation of the curriculum

To develop positive attitudes and critical thinking toward ES and SD among students there needs to be a realization for a more inclusive and participatory approach to teaching and learning at the university. Approaches like ESD are crucial in achieving sustainability goals and awareness in higher

education as they involve students' and staff's capacity building and awareness so that they take on the responsibility of establishing a sustainable future. Findings from this study imply that while Wits University is steadily approaching sustainability and SD concerning the sustainability modules offered, using the ESD mechanism can help ensure that sustainability is not only integrated well into the curriculum but also ensures an action-orientated and participatory approach that will help students engage with the content and increase their awareness and pro-environmental behaviors. Furthermore, researchers recommend that more sustainability modules be integrated into academic programs and, as Agenda 21 suggests, reorient education toward SD (UN Agenda 21, 1992; Abubakar et al., 2016; Concina & Frate, 2023). This research study suggests that the sustainability modules offered be made mandatory to all students and not as electives. Doing this will ensure that all students are exposed to and engage with sustainability and its related issues.

7.3.2. Awareness campaigns

Although Wits University is committed to SD and climate change efforts and has implemented programs and activities designed to achieve campus sustainability and raise awareness (Wits University, 2024), these programs and activities will be rendered ineffective if they don't consider students' perspectives, attitudes, and views or if they don't involve or engage with students in a meaningful way. Students are not only the future leaders of tomorrow but are also key stakeholders on campus, who play a huge role in the success of university programs or plans. Thus, their participation and involvement are crucial. This research study suggests that campus managers and authorities must engage with and promote students' participation to change their attitudes and perceptions. This can be done by raising awareness of sustainability practices and programs available on campus through developing awareness campaigns, marketing and advertising strategies, and utilizing online and social media platforms.

For instance, university authorities can develop awareness-raising campaigns for the proactive education of students on sustainability practices on campus and use marketing and advertising techniques to craft catchy and informative messages that reach students and create awareness of the sustainability practices and programs available on campus for them to participate in. These resources can assist in increasing awareness, and knowledge and influence pro-environmental behaviors that ultimately change an individual's attitudes and perceptions (Sadusky, 2014; Starovoytova & Namango, 2018). Another resource that university authorities can utilize to raise awareness of ES is through social media. Researchers suggest the need to explore social media as a tool to promote environmental awareness campaigns that can help increase engagement, participation, knowledge, and

awareness of environmental and sustainability topics and issues (Nongqayi, 2021; Syed Azhar et al., 2022). Popular social media platforms such as Facebook, X, and YouTube, and streaming platforms such as podcasts are some of the resources the university can implement into their awareness campaigns and marketing/advertising plans to reach a wider audience and make information around ES more understandable and engaging.

7.3.3. Recommendations for future research

Given that this research study focused on students' attitudes and perceptions toward ES at one School, this study can be considered a starting point for achieving campus sustainability at the university. Future research can expand to include students from various schools/disciplines, universities, and campuses considering that there is a growing emphasis on SD in HEIs. Furthermore, future research can investigate whether students' attitudes and perceptions toward ES vary between campuses, universities, and across schools. This research study only considered students' attitudes and perceptions but more factors such as barriers and behaviors to participating in ES on campus can be explored. A theoretical framework, such as the Theory of Planned Behavior by Ajzen (1991) or the Social Constructionist theory, can be introduced in future research to link the conceptual framework and models used in a research study.

Furthermore, future research could investigate how university students' perceptions and attitudes compare to other social groups and students from other public universities, as we could learn more about how students and management in South African universities and beyond collaborate on issues related to ES and what the impact of initiatives/strategies implemented in these universities is in terms of shaping students' continued engagement with ES. As mentioned in the limitations, future research could reflect more on the differences between actual existing or non-existent ES course content and other initiatives at Wits University, and students' perception of these.

7.4. Conclusion

This research study was conducted to explore Wits University's students' attitudes and perceptions toward ES, focusing on three elements: students' knowledge and awareness of ES, their attitudes and perceptions towards ES on campus, specifically academic programs and sustainability programs, and initiatives on campus, and the factors influencing students' decision to act sustainably. The study revealed that while students at Wits University are both aware and knowledgeable of ES, they have negative attitudes and perceptions toward ES on campus, which prevent them from gaining awareness of ES, participating, and engaging with sustainability initiatives and academic programs on campus.

Despite this, the results also revealed that not only are students influenced by their concern for the environment but that they are willing to participate in sustainability initiatives available on campus, which is very encouraging.

The findings from this research study not only provide insight into how students perceive and understand ES on campus but also may help university campus managers and planners by providing them with information that can assist them in creating awareness of ES and participation in sustainability initiatives on campus and instill a culture of sustainability in the university, thus, achieving campus sustainability. As Wits University continues its commitment to SD and sustainability efforts, it is crucial that everyone, particularly students, "not only understand the meaning of ES and sustainability but also translate this meaning into meaningful practices" (Syed Azhar et al, 2022, p.15). HEIs can promote or hinder positive attitudes and perceptions, and as society continues to tackle global sustainability challenges, HEIs ought to consider this their responsibility.

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9. Appendices

Appendix A: Interview Questions

1. What is your understanding of environmental sustainability?
2. What is your source of information about environmental sustainability? How has it helped you to be knowledgeable and aware of environmental sustainability and its related issues?

Appendix B: Online Questionnaire

Section 1: Demographics

1. Gender: Female or Male
2. Age: 18-25 years; 26-30 years, 31-40 years
3. Year of study: 1st-year undergraduate; 2nd – 4th-year undergraduate; post-graduate.
4. Residential status: Off-campus; On-campus residential halls.

Section 2: Students' concern for environmental sustainability

(Choose one)

Who do you think is responsible for safeguarding the environment and resources?

1. Everyone
2. Government
3. Private sector
4. Universities
5. Young people

Section 3: Students' attitudes towards environmental sustainability

1. When deciding to enroll at Wits University, I was influenced by the university's sustainability programs.
    - *(Strongly Agree; Agree; Uncertain; Disagree; Strongly Disagree).*
2. What do you do after using a packet of chips or juice bottle/can?
    - *(Save it until I find a bin; Recycle it at the correct bin; Dump it anywhere)*
3. I can contribute towards an environmentally friendly sustainable campus.
    - *(Strongly Agree; Agree; Uncertain; Disagree; Strongly Disagree).*
4. What is your view on the preservation of the natural environment and resources?
    - *(Very necessary; Necessary; Neutral; Not Necessary).*
5. Wits University encourages participation in sustainability initiatives on campus.
    - *(Strongly Agree; Agree; Uncertain; Disagree; Strongly Disagree).*
6. How important do consider sustainability to be?
    - *(Very Important; Important; Neutral; Not Important).*

Section 4: Students' perceptions of environmental sustainability

1. My courses have encouraged me to think and act in an environmentally friendly manner.
    - *(Strongly Agree; Agree; Uncertain; Disagree; Strongly Disagree).*
2. My course does not require a sustainability element.
    - *(Strongly Agree; Agree; Uncertain; Disagree; Strongly Disagree).*
3. I don't see marketing ads about sustainable practices and programs available on campus.
    - *(Strongly Agree; Agree; Uncertain; Disagree; Strongly Disagree).*
4. How important is it to adopt positive environmental behaviors and practices for the well-being of the environment and future generations?
    - *(Very Important; Important; Neutral; Not Important).*
5. How knowledgeable do you consider yourself to be on sustainability-related issues?
    - *(Very Knowledgeable; Knowledgeable; Somewhat Knowledgeable; Less Knowledgeable; Not Knowledgeable).*
6. All my lecturers at Wits University have integrated sustainable development and sustainability issues well in my subjects.
    - *(Strongly Agree; Agree; Uncertain; Disagree; Strongly Disagree).*
7. How important is it to you to work at a company/organization that contributes positively to the environment and society?
    - *(Very Important; Important; Neutral; Not Important).*

Section 5: Influences sustainable practices

(Choose one)

What influences your decision to act sustainably?

- Sustainability programs/initiatives available on campus
- Advertising of green/sustainable practices on campus
- Personal concern for the environment
- Social norms (influence from family and peers)
- News / Film documentaries
- Influencers
- Social Media / Blogs
- Courses taught at the university

Section 6: Students sustainability practices on campus

(Choose one)

Which environmentally friendly practices do you perform daily?

- Recycling
- Water conservation (.i.e. switching off taps, using water sparingly)
- Energy conservation (.i.e. switch off lights and electronic appliances when not in use)
- Purchase environmentally friendly products
- None of the above

Section 7: Students willingness to participate in campus sustainability

If the university provided sustainability initiatives and programs, how likely would you participate?

- Very likely
- Likely
- Maybe
- Unlikely
- Very unlikely