IMPACT OF PLACED BASED LEARNING ON WATER CONSERVATION PRACTICES AMONG HOSTEL RESIDENTS IN UNIVERSITY OF BENIN

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION, FACULTY OF EDUCATION, UINIVERSITY OF BENIN, BENIN CITY, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE B.S.c (Ed) DEGREE IN ENVIRONMENTAL EDUCATION, UNIVERSITY OF BENIN.

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CERTIFICATION

We, the undersign certified that this project work was carried out by **Precious OGBEMUDIA** with matriculation number **EDU2009317** as partial fulfilment of the requirement of the award of Bachelor of Science BSc. (Ed) Environmental Education, University of Benin.

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DEDICATION

This research work is dedicated to God Almighty.

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ABSTRACT

This study investigated the impact of place-based learning (PBL) on water conservation practices among hostel residents at the University of Benin. Two research hypotheses guided the study, focusing on the effects of PBL on residents' knowledge and attitudes toward water conservation.

A quasi-experimental design was employed, involving 50 hostel residents selected through purposive sampling and divided equally into experimental (n=25) and control (n=25) groups. The experimental group participated in interactive PBL activities on water conservation, while the control group received no intervention. Data were collected using a self-structured questionnaire measuring respondents' knowledge and attitudes toward water conservation, validated for content and reliability (Cronbach's alpha ≥ 0.70). Data were collected using a validated and reliable self-structured questionnaire and analyzed using descriptive statistics and independent samples t-tests.

Findings revealed that PBL had a statistically significant positive effect on both knowledge and attitudes toward water conservation among the experimental group compared to the control group. The study concludes that PBL is an effective strategy for promoting water conservation awareness and fostering positive attitudes among students. It is recommended that PBL be integrated into university environmental education programs and supported through sustained institutional interventions, community partnerships, and improved water management infrastructure.

TABLE OF CONTENTS **Page**

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

With the growing threat of environmental crises such as climate change, education has become one of the most powerful means of promoting sustainability (Komatsu *et al*., 2020; Sumida, 2024). Global frameworks like the United Nations Millennium Development Goals and the Sustainable Development Goals highlight the need to expand access to modern education while strengthening literacy and numeracy skills (Komatsu *et al*., 2023). These core competencies are seen as essential in equipping learners to think critically, evaluate information, recognize pressing social and environmental challenges, and develop independent reasoning. In doing so, education encourages individuals to question existing social practices and take action toward building a more sustainable future (Rappleye *et al.*, 2024).

However, this paradigm has increasingly come under scrutiny. Critics argue that it exacerbates environmental issues by promoting human independence from others, including nature, and hindering recognition of our interdependence (Orr, 2009; Silova, 2021). This argument, first voiced decades ago (White, 1967; Naess, 1973), now finds support in scientific research. Psychologists demonstrate that individuals with strong independence tend to engage in pro-environmental behaviors less frequently than those who value interdependence (Arnocky *et al.,* 2007; Chuang *et al.,* 2016; Komatsu *et al.,* 2022). Additionally, studies suggest that countries emphasizing independence generally exhibit higher environmental impacts compared to societies prioritizing interdependence (Komatsu *et al.,* 2019; Komatsu *et al.*, 2021).

Understanding the importance of interdependence has led educators and researchers to design various strategies aimed at nurturing this value, especially in connection with environmental issues. Among these strategies, one of the most widely recognized is place-based education (Semken and Brandt, 2010; Horlings, 2015; Grenni *et al.*, 2020). Its goal is to help students develop a strong sense of connection and interdependence with their immediate surroundings, a concept often referred to as "place attachment.". Place attachment describes the strong bond individuals form with their environment, encompassing both emotional and cognitive dimensions. The emotional aspect refers to the feelings or sentimental ties people develop toward a place, while the cognitive aspect relates to their understanding, awareness, and beliefs about that environment (Daryanto and Song, 2021). Developing a sense of interdependence and attachment often begins with building ecological knowledge and awareness of the social context, which then gradually fosters deeper emotional connections to the place (Worster and Abrams, 2005).

Place-Based Learning (PBL) is a teaching strategy that links education to the immediate surroundings, everyday experiences, and communities of learners. Rather than focusing only on abstract ideas, it uses the local environment as a foundation for knowledge, helping students engage directly with real challenges that affect their lives. The approach prioritizes hands-on learning, problem-solving, and active involvement in community issues. When applied to water conservation in tertiary institution hostels, PBL has the potential to shape students' attitudes and daily habits. By engaging residents in spotting points of water wastage, tracking consumption patterns, and creating context-specific solutions, the method transforms learning into something practical and relatable. This experience not only raises awareness but also fosters a sense of

responsibility and encourages lasting behavioral change. Consequently, hostel residents become more inclined to conserve water by cutting down on unnecessary use, quickly reporting leaks, and practicing more mindful consumption.

Research indicates that developing attachment to a place encourages individuals to take part in community activities, which in turn supports neighborhood renewal and overall improvement (Brown *et al.,* 2003; Manzo and Perkins, 2006; Amundsen, 2015; Wu *et al.*, 2019). Furthermore, research has shown that individuals with stronger attachment to a place are more likely to engage regularly in behaviors that support and protect the environment (Scannell and Gifford, 2010; Ramkissoon and Mavondo, 2017). The influence of place-based education goes beyond simply raising environmental awareness; it also plays a role in challenging and reshaping colonial legacies within education. Conventional sch /ooling, with its emphasis on abstract and decontextualized knowledge, can unintentionally reinforce existing colonial structures in educational systems (Beech, 2023; Saito *et al.*, 2023). Unlike traditional approaches, place-based education highlights knowledge that is rooted in the unique environment and historical experiences of a community (Semken and Freeman, 2008; Ormond, 2013). This shift in focus has the potential to question and gradually break down the enduring influences of colonialism that remain embedded in educational practices.

Water is a vital resource that sustains all forms of life, which is why it is recognized as one of the fundamental necessities for human survival (Eteng and Ajom, 2021). Given its importance, ensuring access to water remains a critical global concern. However, water is a limited resource that is being rapidly depleted, resulting in growing challenges in meeting daily needs across the

world (UN-WATER, 2017a). According to the World Health Organization (2018), water intended for human consumption must come from sources that are safe, clean, and free from contaminants. This means that individuals should have reliable access to potable water from improved sources located within reasonable distances from their households. In line with this perspective, access to safe drinking water is assessed by the proportion of people able to obtain sufficient quantities of clean water each day from healthy and sustainable sources (Eteng and Zion, 2022).

Effective management of water resources is widely regarded as one of the most important strategies for ensuring their preservation (Bhakar *et al*., 2015; Leeuwen, 2017). This involves improving efficiency in water treatment and distribution systems, encouraging responsible use to minimize daily demand, and promoting practices such as recycling and reuse. Approaches to managing urban water demand are generally classified into three categories: socio-political, economic and financial, and structural or technical measures (Kanakoudis, 2002; Sharma and Vairavamoorthy, 2009; Guedes *et al*., 2014). Socio-political measures include the creation of policies, regulations, and educational initiatives designed to encourage responsible water consumption. Economic and financial measures focus on tools such as tariffs, taxes, incentives, or penalties, which can motivate utilities to improve efficiency and encourage users to conserve water. Structural and technical measures, on the other hand, involve practical interventions such as installing water-saving devices, implementing recycling systems, and exploring alternative sources like harvested rainwater.

Encouraging water conservation within buildings plays a crucial role in controlling urban water demand. Beyond saving water, it also supports broader sustainability goals by lowering the

volume of wastewater generated, cutting operational costs in both water supply and sewage treatment, easing pressure on potable water resources, and protecting river basins and surrounding ecosystems (Egan, 2014; Reed, 2012). According to Nunes *et al*. (2019a, 2019b), public buildings in particular are among the largest consumers of water and are prone to considerable wastage. One major reason is that occupants are not directly responsible for paying the water bills, which reduces their motivation to use water responsibly. Furthermore, the absence of regular maintenance in building water systems often contributes to avoidable losses.

1.2 Statement of the Problem

The rapid growth of urban populations, driven by rising population numbers and ongoing urbanization, has sharply increased the demand for drinking water. At the same time, water supply systems are struggling to keep pace, creating a widening gap between what is needed and what is available. This mismatch poses one of the greatest difficulties in managing water resources, a problem felt most acutely in developing nations (Bernardo *et al.,* 2015; Guedes *et al.,* 2014; Leeuwen, 2017; Richter *et al.,* 2013; Silva *et al.*, 2017).

Agriculture remains the world's largest consumer of freshwater, accounting for about 70% of global reserves (UN-WATER, 2017a). However, studies show that nearly 60% of this water is lost through leaks, poor management, and inefficient farming methods (WWF, 2017). Rising demand for water is further driven by unsustainable usage and the limited availability of freshwater in arid regions. Sub-Saharan Africa, which spans arid and semi-arid zones, is among the areas expected to experience some of the most severe impacts of climate change on water resources (Misra, 2014). For this reason, the region urgently needs to rethink its water

management strategies, promote awareness among its citizens, and adopt effective conservation measures.

Nigeria is richly endowed with natural resources, yet there is a pressing need for more inclusive and well-structured educational strategies, particularly in the area of water management. By examining existing methods and the current education framework, this study seeks to propose approaches that can broaden participation and improve awareness of water conservation, protection, and sustainable use of the country's water resources. In practice, however, society continues to devote significant amounts of time and money to research and data gathering aimed at managing ongoing problems, rather than addressing their root causes to prevent them altogether. Education presents a powerful tool in tackling global water scarcity challenges, as it can reduce waste, promote conscious use of natural resources, and cultivate a sense of responsibility toward the environment. When implemented effectively, education can safeguard economies, preserve ecosystems, and strengthen stewardship of vital resources (Solis-Mart, 2017).

Environmental education has become a key approach to promoting sustainable development. It involves a continuous effort to raise awareness among people about their ecological surroundings while also cultivating the skills, values, and attitudes needed to live harmoniously with nature (Rodrigues, 2014). Within this framework, water education plays a vital role, as it highlights the ways communities depend on and influence water resources. Its core aim is to show the deep connection between natural ecosystems and human well-being. By learning about water management, individuals can develop a stronger sense of responsibility, recognizing that their choices have both immediate and long-term effects on the environment. Examining existing water

education strategies and seeking ways to improve them reveals a troubling reality: water is often treated as if it were endlessly renewable, when in fact, it is a limited resource (Jabareen, 2006). Although traditionally regarded as renewable, the rate of human consumption and misuse has exceeded natural replenishment levels, pushing this vital resource toward dangerous depletion (Jabareen, 2006).

1.3 Research Question

To guide this study, the following questions are posed:

1. How does place-based learning influence the knowledge of hostel residents at the University of Benin regarding water conservation practices?
2. In what ways does place-based learning shape the attitudes of hostel residents at the University of Benin toward conserving water?

1.4 Hypotheses of the Study

Null Hypothesis (H_0): There is no significant difference in the knowledge and attitudes towards water conservation practices between hostel residents exposed to place-based learning and those not exposed to it.

Alternative Hypothesis (H_1): There is a significant difference in the knowledge and attitudes towards water conservation practices between hostel residents exposed to place-based learning and those not exposed to it.

1.5 Purpose of the study

The primary aim of this study is to assess how place-based learning influences water conservation practices among hostel residents at the University of Benin. Specifically, the research seeks to:

1. Examine the effect of place-based learning on the knowledge of hostel residents regarding water conservation.
2. Explore how place-based learning shapes the attitudes of hostel residents toward water conservation.

1.6 Significance of Study

Within this context, universities hold a critical responsibility in promoting the sustainable use of water through both technological advancements and behavioral change. Simply recommending improved practices is not enough; practical implementation of these solutions is necessary. This is especially important in public higher institutions, where conservation initiatives can have a wide impact, allowing universities to serve as role models for the wider society (Abu Qdais *et al.,* 2019; Egan 2014; Marinho *et al.,* 2014; Silva *et al.,* 2005).

University campuses consume electricity and water on a scale comparable to that of a medium-sized city. This is largely because they accommodate a wide range of activities, much like an urban space that combines residential, commercial, and even industrial functions (Bonnet *et al*., 2002; Hasim *et al*., 2020; Marinho *et al*., 2014). As a result, assessing water usage and creating effective conservation strategies within universities can be quite complex. Despite these challenges, researchers have developed various approaches to generate useful indicators that support sustainable water management. Encouragingly, many institutions have already achieved notable success in implementing water-saving initiatives.

Across the world, universities are increasingly striving to create sustainable campuses, recognizing the economic, social, and environmental advantages that come with such efforts (Abu Qdais *et al*., 2019). Literature provides several case studies on responsible water management in higher education, showcasing both structural and educational strategies. These include the establishment of regulatory committees that bring together stakeholders, government representatives, staff, and students; investments in water-efficient technologies, rainwater harvesting, and recycling systems; as well as the upgrading of laboratory equipment to reduce water waste (Bhakar *et al*., 2015; Hasim *et al*., 2020; Puertas and Marti, 2019). Building on this background, the present study examines patterns of water use amongst students residing in the University of Benin hostels and proposes measures to strengthen sustainable water management on campus.

1.7 Scope and Delimitation of the Study

This study focuses on examining the impact of place-based learning on water conservation practices, particularly in terms of the knowledge and attitudes of hostel residents. The research will be conducted among students residing in hostels at the University of Benin. The study is specifically limited to hostel residents within the University of Benin, and does not extend to students living off-campus or to other institutions.

CHAPTER TWO

LITERATURE REVIEW

This chapter will be discussed under the following subheadings:

- Place-Based Learning: Definition and Principles
- Challenges in PBL
- Sustainability as Environmental Education
- Water as a Reliable Resource
- Environmental Practices and Water Conservation in Higher Education Institutions
- Higher Education Institutions' Students' Literacy in Sustainable Use of Potable Water
- Theoretical Background for Current Water Conservation Research
- Criticism of Current Water Conservation Interventions
- Social Practice Theory (SPT)
- Awareness and Perception
- Summary of Literature Review

2.1 Place-Based Learning: Definition and Principles

Place-based learning, often referred to as place-based education (PBE), describes a broad approach to teaching that emphasizes hands-on, community-centered, and environmentally aware experiences. Its goal is to deepen students' connection to the unique culture, history, and ecology of their immediate surroundings (Smith, 2002; Sobel, 2004; Orr, 2013). Although its roots trace

back to earlier educational philosophies such as Dewey's writings in the 1920s PBE gained renewed momentum in the 1990s as educators sought to counteract neoliberal reforms that tended to weaken ties to community, culture, and environmental responsibility (Semken and Freeman, 2008). Central to this approach is the idea of active, inquiry-driven learning that fosters a sense of belonging to place while encouraging learners to explore the many dimensions social, cultural, ecological, political, and economic of the spaces where they live and study (Nichols *et al*., 2016). Today, the term broadly encompasses teaching practices that are locally grounded, community-oriented, or environmentally focused.

Several scholars (Bowers, 2008; Schild, 2016; Smith and Sobel, 2010) describe place-based learning (PBL) as an approach that centers on hands-on, community-oriented, and context-driven learning, designed to nurture civic identity and active participation. By strengthening ties to the local community, PBL encourages learners to consider collective well-being alongside personal interests (Schild, 2016). A central goal of this model is to rebuild meaningful relationships between schools and the communities they serve, drawing on local processes and community-focused education to create deeper engagement (Sala, 2007). Within this framework, students are encouraged to identify local challenges and respond to them, cultivating a sense of citizenship that often includes environmental awareness and stewardship (Smith and Sobel, 2010; Schild, 2016).

Waite (2013) argues that truly "knowing" a place involves appreciating its complexity and recognizing both its uniqueness and its similarities to other locations. Yet, some researchers note a growing sense of "placelessness," largely linked to globalization and increasing mobility, where individuals may feel more connected to distant places than to their own surroundings, sometimes

leading to alienation from their immediate community (Kane *et al*., 2016; Wattchow and Brown, 2011).

In PBL, "place" carries significance beyond its physical coordinates. Scholarship in this field highlights the value of the cultural commons, acknowledging that local communities preserve intergenerational knowledge, skills, and traditions ranging from artistic expression and ceremonies to civic practices that can counteract the often harmful effects of consumerism and global culture (Bowers, 2008). From this perspective, place encompasses political, social, and ethical dimensions that enrich teaching and learning (Israel, 2012). One influential framework (Ardoin, 2006; Ardoin *et al*., 2012) identifies four interconnected aspects of place: Biophysical – the physical and ecological characteristics of the setting; Psychological – an individual's personal experience within that setting; Socio-cultural – the influence of societal and cultural relationships tied to the place; Political-economic – the ways governance and economic structures shape perceptions of and interactions with place.

Granit-Dgani (2021) offers a contemporary model of place-based learning (PBL) built around four interconnected dimensions. The first, "learning in place," shifts instruction from the classroom into an outdoor or community setting without necessarily altering the lesson itself. The second, "study of the place," involves observing and analyzing the environment and the systems operating within it while remaining in that context. The third, "learning from the place," emphasizes the educational value inherent in the environment and its features, which can actively shape teaching and learning. The final dimension, "learning for the sake of the place," encourages

learners to use insights from the previous three dimensions to advocate for positive change in that environment (Granit-Dgani, 2021).

These dimensions influence the way pedagogy is shaped within PBL. Smith (2002) identifies five hallmarks of place-based education practices. First, learning starts with a specific, local issue that serves as an entry point to broader and more distant knowledge. Second, unlike traditional classrooms where students primarily absorb information, PBL positions them as active creators of knowledge (Smith, 2002; Wattchow and Brown, 2011; McInerney *et al*., 2011). Third, the teacher's role evolves from directing content and delivery to guiding, facilitating, and sometimes allowing students to determine what and how they learn (Smith, 2002; Smith, 2007; Beames and Ross, 2010; Wattchow and Brown, 2011). Wattchow and Brown (2011) further describe the teacher as a mediator, storyteller, and interpreter, bridging students and their surroundings. Fourth, because student curiosity drives learning, their questions and interests shape the focus of study. Finally, PBL intentionally blurs the line between school and community, inviting local residents into the classroom and encouraging students to contribute meaningfully to community life (Gruenewald, 2005; Smith, 2007; Wattchow and Brown, 2011).

The idea of "place" extends well beyond its basic geographic meaning, encompassing the political and economic decisions that shape communities and influence everyday life (Gruenewald, 2003a). In this sense, place also serves as a lens for understanding how local realities are linked to broader global patterns (Gruenewald, 2003a). Within the literature on place-based learning, some scholars discuss a critical pedagogy of place, which examines how histories of settler colonialism intersect with the construction of place, particularly in Global North settings (Seawright, 2014; Tuck *et al*.,

2014). These perspectives draw attention to the ways place in these contexts has been framed through systems of white supremacy, heteropatriarchy, and human-centered worldviews (Spillett, 2021). Consequently, such approaches to place-based education emphasize uncovering cultural histories and sustaining the "cultural commons" (Bowers, 2008) while working to dismantle oppressive structures and relationships (Seawright, 2014).

2.2 Challenges in PBL

Several challenges have been identified in applying place-based learning (PBL) in schools. To begin with, PBL is still widely regarded as an innovative and somewhat unconventional form of teaching. Introducing it often disrupts long-established classroom roles and familiar approaches to instruction (Smith, 2007). Both teachers and students are socialized into particular expectations about how knowledge should be delivered and received, while schools themselves are structured around long-standing traditions of content delivery. Moving lessons into flexible or outdoor spaces can also create discomfort for some, with concerns over how such settings may affect instruction, classroom management, or even student safety (Granit-Dgani, 2021).

Implementing PBL also demands considerable time, planning, and resources. Frequent, in-depth meetings among teachers are necessary (Lieberman and Hoody, 1998), and many educators report that the organizational demands such as liaising with community partners and handling added bureaucracy are significant (Powers, 2004). Teachers are often expected to design curricula and materials themselves (Smith, 2002). Without clear guidance from existing standards or frameworks, they may feel exposed and uncertain, especially as learning shifts toward a co-constructed model. A broader shift in mindset is needed: educators must accept that learning

extends beyond traditional academic subjects, while parents should recognize that knowledge is inherently interdisciplinary (Smith, 2002). Communities including local businesses and civic institutions are called upon to see themselves as active partners in education, and adults must view students as contributors and decision-makers whose perspectives matter (Smith, 2002). Collaborating with external experts can enrich the process, yet many teachers feel unprepared for this because of competing demands and limited support (Smith, 2007).

Beyond these practical hurdles, critiques of place-based education raise conceptual concerns. Defining "place" and "identity," and translating learning into genuine community activism, remains a challenge (McInerney *et al*., 2011). Students' perceptions of the environment differ widely, meaning PBL must navigate varied relationships between individuals and their surroundings (Semken and Freeman, 2008). Scholars also caution against a strict separation of the local and global, or urban and rural, as PBL sometimes frames these in oppositional terms (Nespor, 2008; Waite, 2013). Global issues such as climate change, political upheaval, or economic shifts are experienced locally and call for reflective engagement (Rizvi, 2009). However, PBL can occasionally overemphasize immediate spatial contexts, neglecting larger interconnections (Wattchow and Brown, 2011). Another criticism is that it may portray "community" as uniform and static, overlooking diversity and ongoing social change within and across places (Nespor, 2008). Gruenewald (2003b, 2005) further notes that much of the literature aligns PBL closely with agricultural or ecological education, leaving urban contexts underexplored.

Furthermore, one key challenge in the literature on PBL remains the "complexities and interactions of the 'place/non-place binary'" (Bertling, 2018). As Bertling noted, "nonplace" is space detached from relations to other areas and detached from social bonds that situate an existing place. "Natural" areas that are highly curated or regimented may be considered non-place. For example, capitalistic consumer spaces, including food courts, conference rooms, or chemically treated lawns, may serve as obstacles to meeting the intentions of PBL (Bertling, 2018). Amid a rapidly changing technological landscape, this binary of place/non-place in the teaching and learning process has shifted.

2.3 Sustainability as Environmental Education

Sustainability is founded on the idea that society must meet present needs without jeopardizing the ability of future generations to meet theirs, highlighting the interdependence between humans and the natural world (Morgan, 2012). This concept is commonly framed around three interconnected dimensions economic, environmental, and social often called the three pillars of sustainability (Morgan, 2012). Within education, weaving cultural understanding into sustainability is essential. It means recognizing how traditions, values, and social practices influence both community wellbeing and the health of local ecosystems (Boyd, 2019). When teachers appreciate these relationships, they can design learning that embraces diverse perspectives and fosters responsible environmental care (Bascope and Reiss, 2021).

In responding to global issues such as climate change, depletion of resources, and persistent social inequities (Boyd, 2019), sustainability education promotes approaches that protect the welfare of people today while safeguarding opportunities for future generations. Morgan (2012) calls for a

transition toward sustainable learning, helping students see how social structures, communities, and the physical landscape are deeply connected. Likewise, Bascope and Reiss (2021) stress the importance of building ties between learners and their local surroundings, underscoring the need to preserve ecosystems, biodiversity, and vital resources. At its core, sustainability education champions equity, justice, and resilience, empowering communities to thrive inclusively over time.

2.4 Water as a Reliable Resource

Water, a simple compound of hydrogen and oxygen, is indispensable for life and also shapes the moods and experiences that influence human emotions (Otegbulu, 2011; Pinto *et al*., 2017; Sousa *et al*., 2018; United Nations Educational, 2006). Access to clean, safe water often mirrors a country's economic standing, with higher GDP levels typically linked to better water security. Yet projections suggest that by 2025, more than half of the world's population could face some degree of water stress (Rosegrant *et al*., 2002). In several developing regions, demand may outstrip available supply by as much as 50% (Birkenholtz, 2008). Beyond its life-sustaining function, water underpins much of the global economy acting as a universal solvent, supporting industrial operations, and forming the backbone of agricultural production (Gleick *et al*., 2011; Fielding *et al*., 2012).

The Second United Nations World Water Development Report warns that if present consumption patterns continue, by 2025 roughly two-thirds of the world's population could be living in areas of water stress (Rosegrant *et al*., 2002). Climate change, coupled with rising human demand, places additional strain on the sustainability of water supplies (Otegbulu, 2011; de Sá Silva *et al*.,

2022; Ferreira *et al*., 2023). At present, an estimated 2.6 billion people still lack reliable access to safe drinking water, while population growth, shifting lifestyles, and environmental changes continue to intensify competition for limited resources.

Promoting water efficiency centers on minimizing waste rather than enforcing strict limitations on use. It encourages individuals to make small, practical adjustments and to select products that use less water (Otegbulu, 2011; Cook *et al*., 2014; Manouseli *et al*., 2019). Simple strategies include repairing leaks promptly, taking showers instead of baths, installing displacement devices in toilet cisterns, and ensuring dishwashers and washing machines are run with full loads (Fidar *et al*., 2010; Price *et al*., 2014; Pinto *et al*., 2017).

2.5 Environmental Practices and Water Conservation in Higher Education Institutions

Higher education institutions (HEIs) are increasingly expected to take the lead in advancing sustainable development. This responsibility is reflected in numerous global agreements signed by universities, demonstrating a strong collective commitment to sustainability. Beyond offering robust environmental education and conducting research, universities are encouraged to model the principles they teach by embedding sound environmental practices across all programs, engaging society on ecological issues, and promoting a broader shift toward sustainable living (Talloires Declaration, 1990; Halifax Declaration, 1991; Tbilisi Declaration, 1977).

Each year, HEIs produce millions of graduates some trained as environmental specialists and others whose professional activities may significantly affect the environment. At the same time, university campuses themselves can generate considerable environmental footprints through their

day-to-day operations (Alshuwaikhat and Abubakar, 2008; Bonnet *et al*., 2002; Viebahn, 2002). Neglecting or overlooking sustainability contradicts the very mission of education and undermines the societal trust placed in universities. Learning outcomes and behavior change aimed at reducing ecological stress are far more effective when students observe sustainability actively practiced on campus (Bonnet *et al*., 2002; Viebahn, 2002). Moreover, integrating sustainable practices can create opportunities for joint research initiatives with industry and government partners (Adomssent, 2011; Lehmann *et al*., 2009). Conversely, failure to act sends a damaging message to society, suggesting that universities neither value nor are capable of implementing sustainability (Bekessy *et al*., 2007).

Analyses of university websites reveal that many institutions publicly identify sustainability as central to their social responsibility, academic excellence, institutional reputation, and pursuit of leadership in higher education. Phrases such as a commitment to "practice what we preach" (University of Cardiff, 2012; University of Lund, 2012; University of Gothenburg, 2012) and descriptions of the campus as a "living laboratory" for environmental innovation (University of British Columbia, 2012; Harvard University, 2012) are common. The "Lünenburg Approach" emphasizes embedding sustainability at all levels of education and training (Adomssent *et al*., 2008; Beringer, 2007; Barth, 2008).

Despite sustainability's undeniable societal relevance, only a limited number of universities are actively pursuing comprehensive, institution-wide transformation (Thompson and Green, 2005). Simply endorsing sustainability declarations does not guarantee meaningful action, as many universities sign agreements but fail to follow through on their commitments (Wright, 2002;

Bekessy *et al*., 2007). Much of the literature highlights operational concerns such as resource use, energy efficiency, and waste management as the main focus of university sustainability efforts (Alshuwaikhat and Abubakar, 2008).

Introducing reforms in higher education institutions (HEIs) is inherently challenging because universities operate in relatively flat structures that allow academics considerable independence. This autonomy makes it harder to enforce new approaches consistently. Common obstacles to embedding sustainability include limited knowledge or enthusiasm among staff and leadership, lack of time for academics to engage with new initiatives, resistance to altering established routines, and minimal societal pressure to adopt greener practices (Thompson and Green, 2005; Ferrer-Balas *et al*., 2008; Karatzoglou, 2011).

Given these realities, gradual, step-by-step change often creates fewer conflicts than sweeping, top-down mandates. Each stage of progress benefits from open communication and active involvement of the university community, with targeted actions such as visible "quick wins" helping to build momentum for subsequent improvements (Lozano, 2006). Over time, sustainable behaviors can be normalized so that environmentally responsible routines become part of everyday operations (Barth, 2013).

Small groups or individual champions often spark the process by setting examples, demonstrating results, and expanding networks of collaborators (Ferrer-Balas *et al*., 2008). Where senior leadership is not initially engaged, these advocates may work with shifting coalitions of supporters, gradually gaining administrative buy-in by delivering successful projects and

cultivating broader participation (Thompson and Green, 2005). Embedding sustainability is therefore an ongoing learning process that benefits from partnerships, incremental progress, and continual expansion of previous achievements (Barth, 2013).

Despite growing awareness, relatively few universities maintain formal environmental policies or comprehensive campus-wide management systems. Environmental considerations are more commonly confined to specific academic programs or research projects. Competing priorities and the pressures of traditional academic workloads often leave little room for introducing systematic improvements (Karatzoglou, 2011; Ferrer-Balas *et al*., 2008; Thompson and Green, 2005; Viebahn, 2002).

Bonnet and colleagues (2002) describe a water and energy auditing method applied at the University of Bordeaux under the Eurocampus project. This approach relied on high-level administrative commitment, utilized internal expertise, and actively engaged students by aligning auditing tasks with their research interests. All campus water and energy flows were assessed. Challenges included inconsistent measurement practices and the wide diversity of activities across campus facilities. Considerable variation in consumption was observed, particularly within research and development operations, which proved especially resource-intensive.

These disparities mirror results from other multi-institution studies. For example, data gathered through the Ecocampus collaboration at 14 universities across seven countries revealed significant differences in water and energy use due to variations in national context, institutional structures, and campus facilities. Mendes (2006) documented consumption at six Brazilian and five U.S.

universities. Only the University of São Paulo disclosed per-capita figures (70 L per person per day). In the U.S., published data exist for Stanford University and the University of Virginia, at 558 L and 209 L per person per day, respectively. The University of Brasília reported a 73 percent reduction over 16 years, achieving just 21 L per person per day (UNB, 2012).

Such pronounced differences underline the difficulty of comparing consumption rates directly. Variations stem from differences in institutional activities ranging from teaching and research to residential life, food services, athletics, and landscaping. Some campuses include irrigated farmland or large sports complexes, which drive higher usage. Ultimately, water demand is shaped not only by the nature and scale of campus activities but also by the degree of waste and system losses (Maerbal *et al*., 2013).

2.6 Higher Education Institutions' Students' Literacy in Sustainable Use of Potable Water

Universities and other higher education institutions (HEIs) occupy a central position in advancing sustainability, as today's students will soon be the decision-makers shaping society. Equipping learners with the knowledge, skills, and attitudes needed to confront environmental problems lays the foundation for long-term improvements in sustainable practices. With climate change increasingly disrupting global water resources, it becomes vital to gauge students' awareness of these challenges so that programs encouraging responsible water use can be effectively designed (Barreiros *et al*., 2021).

Earlier research has emphasized the role of multiple stakeholders senior administrators, faculty, and students in embedding sustainability within HEIs. Teachers, in particular, have been shown to

make significant contributions toward achieving the United Nations Sustainable Development Goals (SDGs) (Mateus *et al*., 2020). Yet the perspectives of students themselves remain less thoroughly examined. Because today's undergraduates will soon become professionals and leaders, understanding their attitudes and beliefs regarding the SDGs is crucial (Aleixo *et al*., 2021).

Concerns about conserving natural resources, especially water, have gained worldwide visibility, prompting many who were once disengaged to recognize the personal and societal impacts of water scarcity (Lamm *et al*., 2016). Anticipating how individuals and communities might respond to water shortages is essential for designing educational initiatives, outreach campaigns, and effective conservation strategies. Studies show that demographic factors such as gender, age, level of education, and even political views influence environmental values and willingness to engage in preservation efforts (Clark and Finley, 2007; Chaudhary *et al*., 2018).

Water availability is increasingly shaped by the effects of climate change. Data from the World Resources Institute's Aqueduct database reveal that 25 countries already endure extremely high water stress, using nearly all of their accessible freshwater each year. Projections indicate that by 2050, another billion people will live under similarly critical conditions (Kuzma *et al*., 2024). University students occupy a pivotal place in this narrative, as they will be the future adults deciding how water is managed and consumed over the coming decades. Despite this, relatively few studies have explored students' views, intentions, or behaviors regarding water conservation. Research by Barreiros and colleagues (2023) sheds light on practices at Portuguese HEIs,

underscoring the value of closely tracking water use, installing tap reducers, and running awareness campaigns as effective steps toward sustainable campus water management.

2.7 Theoretical Background for Current Water Conservation Research

This section reviews the main theoretical perspectives that shape current studies on water conservation, outlining why certain approaches dominate and pointing to the need for innovative frameworks capable of driving more effective interventions. Limited opportunities to expand or redesign water supply systems have shifted attention toward the human side of the problem, creating what Pearce *et al*. (2013) describe as a growing preference for demand-side, anthropocentric research. Most policy-oriented studies on water saving now concentrate on the individual, examining what motivates or discourages conservation. Within this field, models such as Kaplan's (2000) Reasonable Person Model and Ajzen's (1985) Theory of Planned Behavior have been especially influential. Rooted in environmental psychology, these approaches suggest that pro-environmental actions follow a rational decision-making path, where behavior is shaped by external prompts like pricing or product details and by personal attitudes and beliefs. This perspective is often summarized under the Attitude–Behavior–Change (ABC) framework (Shove, 2010). Table 2.1 shows examples of interventions relying on such an approach. Therein each Intervention is allied to either a Reasoning Pathway (RP) or Intuition pathway (IP), as outlined in Figure 2.1.

A widening range of contextual influences including physical infrastructure and material conditions has been linked to the so-called "value–action gap," reframing cause-and-effect dynamics in ways that policymakers may use to design targeted interventions (Labanca and

Bertoldi, 2018). Within water conservation, this gap is particularly evident and increasingly problematic: although broad ideological agreement on the importance of saving water exists, real-world evidence of consistent behavioral follow-through remains limited (Satur and Lindsay, 2020).

Roughly a decade ago, behavioral economics began to attract significant attention within the UK government and in policy circles worldwide, particularly with the creation of the Behavioral Insights Team (BIT). This group has become well known for applying "nudges" low-cost, evidence-

Table 2.1: Examples of interventions using an ABC framework approach

Intervention	Description	Reference
Socio-technological (RP)		Zadeh *et al.* (2014); Mao *et al.* (2020)
Priced Non-price based (RP)	• Taxes and subsidies • Water charges • Regulation • Technology • Information provision	Lu (2020), Kallis (2008)
Push-Pull nudge (IP)	• Pushing change (mandating technological efficiency through design codes)	Lu (2020), Lodge and Wegrich (2016)
	• Pulling change (incentivising the adoption of smart meters)	
	• Nudging change (using frames for encouraging water conservation behaviours)	

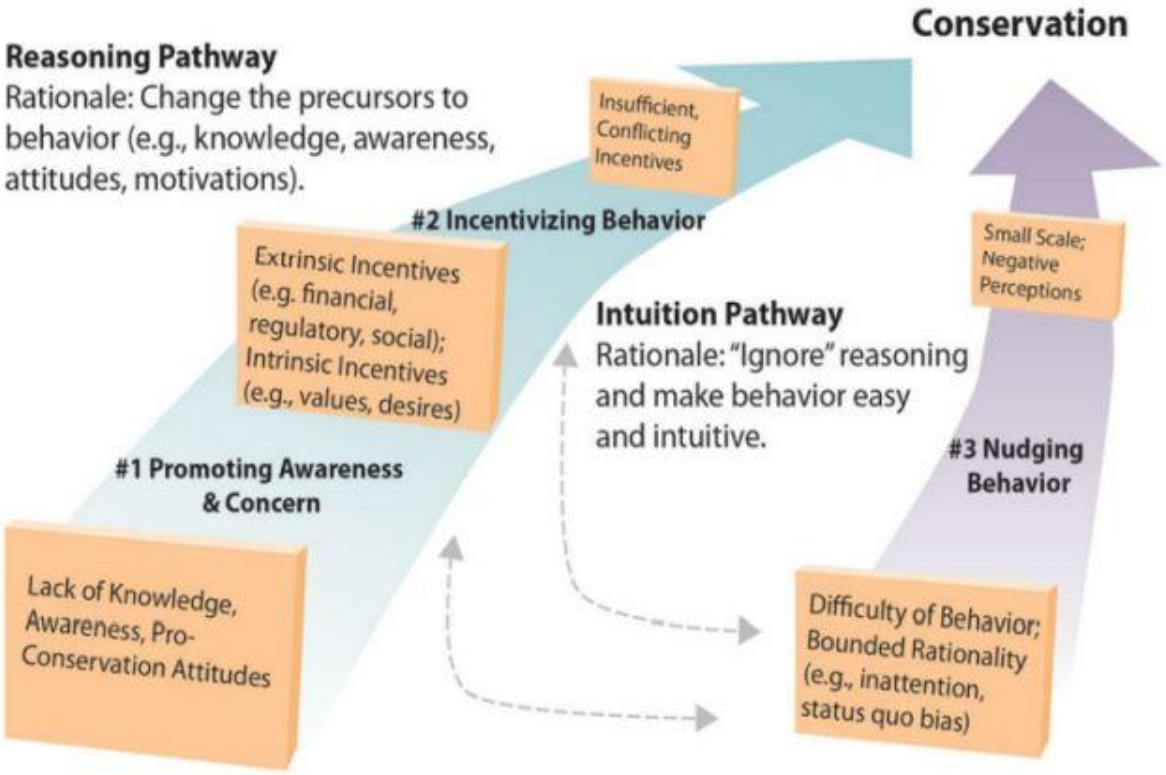

Figure 2.1: Model based on the ABC for guiding conservation policy (Blake, 1999).

based strategies that can be incorporated into existing conservation policies with minimal structural change (Hampton and Adams, 2018).

The use of behavioral economics in shaping policy has become closely associated with the idea of the "nudge," introduced by Thaler and Sunstein in 2009. This concept highlights how people's decisions can be gently steered in beneficial directions (Hampton and Adams, 2018). Behavioral nudges may take many forms, including social comparison, default options, message framing, or commitment mechanisms (Reddy *et al*., 2017). Insights drawn from previous studies and increasingly adopted by policymakers are effectively summarized in the framework developed by Reddy and colleagues (2017), which draws together models from other disciplines to guide conservation strategies. This was based on the premise that individual behavioral change will lead to a conservation solution as shown previously in Figure 2.1.

A significant body of psychological research has explored five primary drivers behind household water-saving practices: individual attitudes, underlying beliefs, habitual routines, personal skills or abilities, and surrounding contextual influences (Russell and Fielding, 2010).

2.8 Criticism of Current Water Conservation Interventions

The "nudge" approach has drawn extensive criticism, particularly for what some describe as its libertarian paternalism. Lodge and Wegrich (2014) point out a paradox within this framework: while it assumes policy makers have limited rationality, it simultaneously credits them with the ability to identify optimal choices, presenting "evidence-based" solutions that appear inexpensive and sophisticated yet are often shaped by political and financial pressures, with a risk of confirmation bias. Shove (2010) argues that the heavy reliance on the Attitude–Behavior–Choice (ABC) model reflects a governmental belief that individual decisions alone can meaningfully reduce water demand. Other scholars highlight a deeper tension between water as an economic commodity and efforts to encourage conservation (Pearce *et al*., 2013). Within the UK's

neoliberal context, this tension fosters misleading narratives portraying water as an endlessly available urban convenience while framing users as possessing uncontrolled consumption habits, even in the face of climate challenges. Shove *et al*. (2012) contend that the ABC framework is as much a political stance as a theoretical one, casting individuals as both the cause and solution to the problem while downplaying the role of government in maintaining unsustainable institutions and practices. Building on this, Shove (2014) suggests that policies are not simply tools to steer behavior but are themselves products of the systems they aim to influence. Ongoing debates in the water sector such as utilities' reactions to Ofwat's strict regulations and the growing recognition of water justice (Shrimpton *et al*., 2021) highlights the complex, interconnected dynamics that shape current approaches.

Overall, much of the existing research tends to focus on pricing strategies or examines how extreme events influence public perceptions (Gholson *et al*., 2019). Many of these studies aim to establish causal relationships that reinforce the Attitude–Behavior–Choice (ABC) model (Beal *et al*., 2013). Yet, a significant portion of the water conservation literature lacks a broader theoretical foundation that some scholars argue is essential for fostering lasting conservation behaviors. For instance, price-based approaches often assume that individuals such as students will reduce consumption when water is perceived to be more expensive. In practice, however, this assumption may not hold true, as actual usage depends on how water is both valued and priced (Hunt and Rogers, 2014).

2.9 Social Practice Theory (SPT)

An increasing number of studies are turning toward Social Practice Theory (SPT), which views practices as habits sustained through repeated and consistent performance (Shove, 2014). This perspective argues for shifting away from narrowly explaining individual behavior and instead embracing broader, more complex ways of interpreting how students engage in conservation. Social norms within student communities, for instance, are often highlighted as a powerful tool for fostering water-saving habits (Li, 2020). Several scholars contend that relying solely on personal choice is insufficient to drive meaningful societal change (Hargreaves, 2011). Building on Southerton *et al*. (2004), they suggest that individualism, prominence, and behavioral variability can be addressed by shaping new social norms and cultivating a culture of conservation. SPT is particularly valuable because it brings "social life" to the forefront by emphasizing the socio-technical systems that underpin behavior (Gram-Hanssen, 2010).

Rather than simply responding to students' current needs, SPT reframes water conservation by considering its underlying elements: meaning (values, aspirations, and symbolic importance), materials (physical resources, technologies, and infrastructure), and competencies (skills, experience, and practical knowledge). This triad provides a broader framework for understanding conservation than traditional approaches (Shove, 2014). Policymakers increasingly favor SPT because it is seen as a relatively low-risk strategy (Hampton and Adams, 2018). However, more work is needed to address potential challenges when applying it as a central model for policy development. Refinements by Satur and Lindsay (2020) have further strengthened SPT's potential as a foundation for future interventions (Figure 2.2).

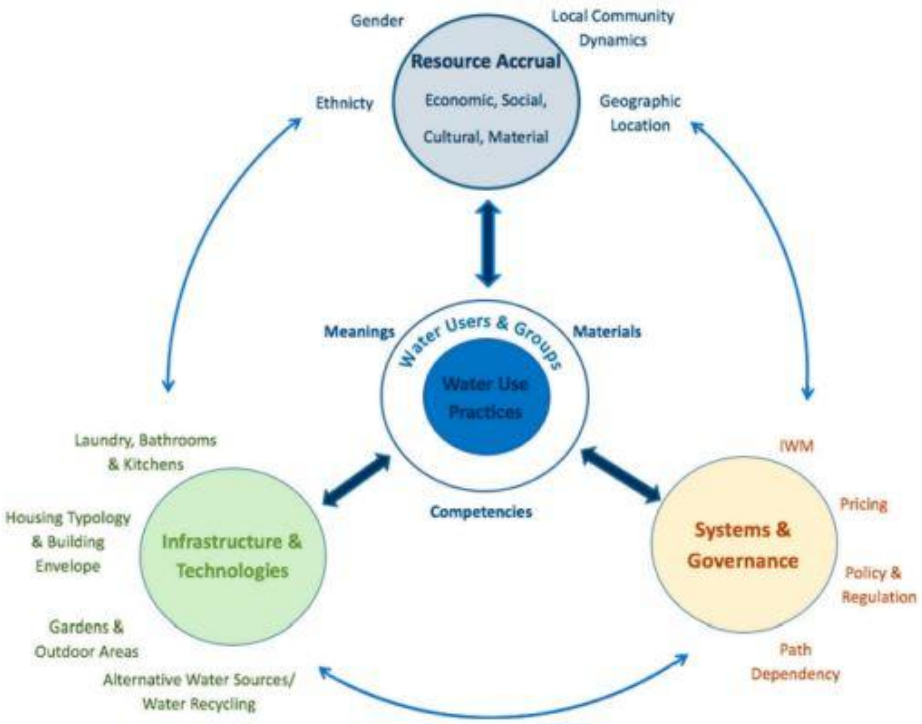

Figure 2.2: Social Practice Theory (SPT) based model for investigating water use practices (Satur and Lindsay, 2020)

Social Practice Theory (SPT) argues that individuals have limited independent control over how they use water because their behavior is shaped by entrenched norms and shared standards (Brown, 2017). This contrasts with the Theory of Planned Behavior (TPB), which views successful behavior change as primarily driven by a person's motivation (intention) and their perceived ability to act (behavioral control). From an SPT perspective, the influence of water pricing a key element of the ABC approach is likely to have much less impact in practice. Although most research tends to examine overall patterns of water use, far fewer studies investigate individual student behavior, including how pricing levels are perceived or how accurately students gauge their own water consumption.

2.10 Awareness and Perception

Awareness can be described as a state of consciousness in which sensory information is recognized and validated by an observer. Perception, by contrast, involves organizing, identifying, and interpreting sensory input to create a meaningful understanding of the surrounding world (Lindsay and Norman, 1977). A person might be fully aware of the importance of conserving water and believe their own water-use habits are exemplary, yet their actual behavior may differ significantly from that belief. Over the past four decades, research on water conservation has shifted from relying solely on basic information campaigns toward strategies that elevate broader social recognition and awareness. Studies indicate that the way messages are framed can strongly influence household water consumption (Addo *et al*., 2019). Nonetheless, the role of awareness is often overlooked or insufficiently examined in the literature (Quesnel and Ajami, 2017).

2.11 Summary of Literature Review

Place-based learning (PBL) links students' everyday surroundings with deeper ecological, cultural, and civic understanding. Building on Dewey's ideas, it favors hands-on inquiry, strong school–community ties, and real-world problem solving. Teachers shift from information delivery to guiding exploration, helping learners connect local issues like water use to broader sustainability goals.

While PBL builds environmental awareness and civic identity, it faces challenges: rigid classroom traditions, planning demands, and uneven guidance. Debates also persist over how "place" is defined and whether focusing too narrowly on the local overlooks global concerns.

Sustainability education frames this discussion, with water emerging as a critical resource increasingly stressed by climate change and population growth. Small daily actions fixing leaks, upgrading fixtures, mindful consumption offer practical conservation steps. Higher education institutions are encouraged to embed sustainability into curricula, operations, and campus culture, yet systemic change is slow without leadership, staff buy-in, and student involvement.

Research shows student perceptions strongly influence future water stewardship, but many studies overlook this group. Traditional behavior models, such as the ABC framework and "nudging," emphasize individual choice, while Social Practice Theory shifts attention to shared routines, infrastructure, and cultural norms offering a fuller picture of why people use water the way they do.

CHAPTER THREE

METHODOLOGY

This chapter outlines the procedures that will be adopted for the study. It will be structured under the following sub-headings:

- Research Design
- Population of the Study
- Sample and Sampling Technique
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Administration
- Method of Data Analysis

3.1 Research Design

The study adopted a quasi-experimental research design. This design was considered appropriate for assessing the effect of place-based learning on water conservation practices, as it allowed for the comparison of outcomes between groups exposed to the intervention and those who were not. In this research, one group of hostel residents was exposed to place-based learning activities on water conservation (experimental group), while another group did not receive such exposure (control group). Pre-tests and post-tests were conducted to determine changes in knowledge and attitudes towards water conservation practices.

The model of the design will be presented as follows:

R1 O1 X O2

R2 O1 – O2

Where:

- R1 = Experimental group
- R2 = Control group
- O1 = Pre-test
- X = Treatment (Place-Based Learning on Water Conservation)
- O2 = Post-test

3.2 Population of the Study

The population of the study consisted of all undergraduate students residing in the University of Benin hostels. These hostels accommodated students from diverse faculties and departments, making them suitable for assessing water conservation practices within a shared living environment.

The target population was 100-level students who were new to the hostel system, as they were more likely to benefit from early intervention in sustainable practices.

3.3 Sample and Sampling Technique

A total of 50 hostel residents were selected as the sample for the study. The purposive sampling technique was employed to ensure that only students who currently resided in the hostels were included. The participants were divided into two groups:

- Experimental Group (25 students): Received place-based learning sessions on water conservation.

- Control Group (25 students): Were not exposed to the intervention. This division made it possible to compare the effectiveness of place-based learning on knowledge and attitudes towards water conservation.

Table 3.1: Sampling Distribution

S/N	Group	Number of Respondents
1	Experimental Group	25
2	Control Group	25
	Total	50

3.4 Research Instrument

The primary instrument for data collection was a self-structured questionnaire. The questionnaire will be divided into three sections:

- Section A: Demographic information of respondents.
- Section B: Items designed to assess knowledge of water conservation practices.
- Section C: Items measuring respondents' attitudes towards water conservation using a modified 4-point Likert scale:
    - Strongly Agree (SA)
    - Agree (A)
    - Disagree (D)
    - Strongly Disagree (SD)

3.5 Validity of the Instrument

The face and content validity of the questionnaire were established by presenting draft copies to the project supervisor and two experts in the Department of Health, Safety, and Environmental Education. Their comments and corrections were incorporated to refine the final version of the instrument.

3.6 Reliability of the Instrument

To ensure reliability, a pilot test was conducted with 20 hostel students who were not part of the study sample. Responses from the pilot test were analyzed using Cronbach's alpha coefficient with the aid of SPSS software. An alpha value of 0.70 or above was considered acceptable, indicating that the instrument was reliable.

3.7 Method of Data Administration

The questionnaires were administered directly to the respondents by the researcher. Participants were assured of confidentiality and encouraged to provide honest responses. The completed questionnaires were retrieved immediately after completion to ensure a high return rate. The experimental group participated in interactive, place-based learning activities on water conservation before completing the post-test, while the control group only completed the pre- and post-tests without any intervention.

3.8 Method of Data Analysis

Data collected were analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequency counts, percentages, means, and standard deviations were used to summarize demographic characteristics, knowledge levels and attitudes of respondents.

Inferential statistics, specifically the t-test, were employed to test the hypotheses and determine whether there were significant differences between the experimental and control groups in terms of knowledge and attitudes towards water conservation.

CHAPTER FOUR

PRESENTATION OF RESULT AND DISCUSSION OF FINDINGS

This chapter provides the analysis of the data gathered for the study. The presentation and interpretation of the results are organized according to each hypothesis examined. The findings are displayed in tables and subsequently discussed.

4.1 Hypotheses testing

Ho_1: Place-based learning has no significant effect on the knowledge of hostel residents at the University of Benin regarding water conservation practices

Table 4.1: Results of Independent Samples t-Test Comparing Post-Intervention Knowledge Scores of Experimental and Control Groups

Group	N	M	SD	t	df	p	M Difference	95% CI
Experimental	25	8.68	1.03	5.18*	39.80	< .001	2.04	[1.24, 2.84]
Control	25	6.64	1.68					

The hypothesis (Ho_1) states that place-based learning has no significant effect on the knowledge of hostel residents at the University of Benin regarding water conservation practices. However, the results of the independent sample t-test presented in Table 4.1 indicate otherwise.

The independent samples t-test was conducted to compare the post-intervention knowledge scores (postk) of residents who received the place-based learning intervention (Experimental Group, n =

25) with those in the control group (n = 25). Preliminary analysis using Levene's Test for Equality of Variances indicated that the variances for the two groups were significantly unequal, F = 12.95, p = .001. Therefore, the results for the "Equal variances not assumed" condition were used to interpret the t-test. The results showed a statistically significant difference between the two groups, t(39.80) = 5.18, p < .001. The Experimental Group (M = 8.68, SD = 1.03) demonstrated significantly greater knowledge of water conservation practices than the Control Group (M = 6.64, SD = 1.68). The mean difference between the groups was 2.04 points, with the 95% confidence interval for the difference ranging from 1.24 to 2.84. This finding suggests that the place-based learning intervention had a statistically significant, positive effect on the knowledge of hostel residents regarding water conservation practices.

Ho_2: Place-based learning has no significant effect on the attitudes of hostel residents at the University of Benin toward water conservation

Table 4.2: Results of Independent Samples t-Test Comparing Post-Intervention Attitude Scores of Experimental and Control Groups

Group	N	M	SD	t	df	p	M Difference	95% CI
Experimental	25	34.00	5.62	2.30	39.75	.027	4.96	[0.60, 9.32]
Control	25	29.04	9.19					

The hypothesis (Ho_2) suggests that place-based learning has no significant effect on the attitudes

of hostel residents at the University of Benin toward water conservation.

The independent samples t-test was conducted to compare the post-intervention attitude scores (*postA*) of residents who received the place-based learning intervention (Experimental Group, n = 25) with those in the control group (n = 25) as shown in Table 4.2. Preliminary analysis using Levene's Test for Equality of Variances was statistically significant, F = 5.72, p = .021, indicating that the assumption of equal population variances was violated. Therefore, the results for the "Equal variances not assumed" condition were used to interpret the t-test. The results showed a statistically significant difference between the two groups, t(39.75) = 2.30, p = .027. The Experimental Group (M = 34.00, SD = 5.62) demonstrated significantly more positive attitudes toward water conservation than the Control Group (M = 29.04, SD = 9.19). The mean difference between the groups was 4.96 points, with a 95% confidence interval that ranged from 0.60 to 9.32. This finding leads to the rejection of the null hypothesis and suggests that place-based learning had a statistically significant, positive effect on the hostel residents' attitudes toward water conservation.

4.2 Discussion of Findings

The results of this study for hostel residents exposed to a place-based learning (PBL) intervention showed significantly higher knowledge and more positive attitudes toward water conservation compared to a control group align with recent empirical findings in environmental education and water literacy research.

4.2.1 Effect of PBL on Knowledge of Water Conservation

The statistically significant improvement in knowledge among the experimental group supports the assertion that experiential and context-based environmental education enhances learners' understanding of ecological and resource-use issues. For example, an outdoor-based "earth education" program conducted by Tessa-Marie *et al.* (2022) among upper-elementary students demonstrated significant gains in both environmental knowledge (system, action, and effectiveness knowledge) and environmental attitude measures.

Similarly, study carried out by Leonardo *et al.* (2024) on evaluating higher-education students' perceptions of water consumption and their beliefs, actions, and conservation awareness found substantial gaps in water-use habits and self-reported unawareness of water consumption highlighting the need for targeted environmental education to improve knowledge and responsible behaviour among university students.

Moreover, broader reviews such as that of Gonzalez (2023) on place-based and sustainability education report that programs rooted in local context and engaging students in real-world environmental issues (e.g. climate change, water challenges) lead to cognitive gains greater understanding of environmental systems and local ecological problems.

Therefore, the increase in water-conservation knowledge in this study's PBL group can be understood as consistent with evidence that contextual, active, and place-grounded environmental learning is more effective than purely didactic or classroom-based education.

4.2.2 Effect of PBL on Attitudes Toward Water Conservation

The observed significant positive shift in attitude among the experimental group is also consistent with recent findings. The “Informal Earth Education” program mentioned earlier carried out by Tessa-Marie *et al.* (2022) reported not only knowledge gains but also significant shifts in environmental attitudes among children after outdoor-based intervention.

Additionally, systematic evidence suggests that sustainability and place-based environmental education improves students' competence, affective dispositions, and environmental responsibility components critical for fostering pro-environmental attitudes and eventual behaviors (Kurniawan *et al.,* 2024).

In a university-level context, a recent study by Leonardo *et al.* (2024) investigated water consumption among students and found that many students lack awareness of their actual water use and face difficulty in translating awareness into sustainable habits, particularly when environmental education is minimal. This suggests that interventions like the one implemented in the present study are valuable, because they combine knowledge with attitude change important first steps toward sustainable water-use behavior.

Thus, the improvement in attitude toward water conservation after the PBL intervention observed in this study aligns well with contemporary findings that environmentally immersive, context-based education can positively influence students' environmental dispositions.

4.2.3 Limitations and Considerations in Light of Literature

Despite congruence with existing research, some caution is warranted. Many studies on environmental education (especially those involving water issues) are carried out among children or general populations, not necessarily among hostel-dwelling university students. For example, the outdoor-based earth-education study by Tessa-Marie *et al.* (2022) was with upper-elementary school students. Also, research on university students' water use by Leonardo *et al.* (2024) reports self-reported data and challenges in converting awareness into sustained behavior.

Moreover, the study of Gonzalez (2023) on place-based or sustainability education notes that while cognitive gains (knowledge) are often evident, the translation into long-term behavior or deep value change may require repeated, sustained interventions rather than one-off programmes.

Given these insights, while this study's positive effects on knowledge and attitudes are promising, they likely represent initial shifts. For long-term water conservation behaviors among hostel residents, reinforcement, follow-up, and integration into routine hostel life may be needed.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study examined the effect of place-based learning (PBL) on the knowledge and attitudes of hostel residents at the University of Benin regarding water conservation. Two hypotheses were formulated and tested:

1. Place-based learning has no significant effect on the knowledge of hostel residents concerning water conservation practices.
2. Place-based learning has no significant effect on the attitudes of hostel residents toward water conservation.

The purpose of the study was to determine whether PBL, as a contextual and experience-driven instructional approach, could improve students' understanding and disposition toward sustainable water-use habits in the hostel environment. The study holds significance, as it highlights the role of environmental education in shaping responsible water conservation behaviors among young adults living in shared residential settings.

A comprehensive review of related literature was conducted, focusing on place-based learning strategies, water conservation awareness, knowledge acquisition, and attitude formation. The literature emphasized that experiential learning grounded in real-world contexts enhances students' engagement, retention of environmental concepts, and willingness to adopt sustainable practices.

The research employed a quasi-experimental design involving 100-level hostel residents who were randomly assigned into experimental and control groups. Data were collected using structured questionnaires that assessed both knowledge and attitudes toward water conservation practices. Descriptive statistics such as means and standard deviations were used to summarize the responses, while inferential statistics specifically independent sample t-tests were utilized to determine the significance of the intervention.

The findings revealed substantial differences between the two groups. Results showed that students exposed to the PBL intervention demonstrated higher levels of knowledge of water conservation than those in the control group. The experimental group recorded a mean score of 8.68 (SD = 1.03), compared to 6.64 (SD = 1.68) for the control group. The independent samples t-test indicated a statistically significant effect, $t(39.80) = 5.18$, $p < .001$, with a mean difference of 2.04 points and a confidence interval of [1.24, 2.84]. These results confirmed that PBL significantly enhanced students' knowledge of water conservation, leading to the rejection of the first null hypothesis.

Similarly, the attitude scores showed a significant positive effect of the PBL intervention. Students in the experimental group reported more favorable attitudes toward water conservation, with a mean of 34.00 (SD = 5.62), compared to 29.04 (SD = 9.19) for the control group. The independent samples t-test produced statistically significant results, $t(39.75) = 2.30$, $p = .027$, with a mean difference of 4.96 points and a confidence interval of [0.60, 9.32]. These results led to the rejection of the second null hypothesis and suggest that PBL effectively improved students' attitudes toward water conservation.

5.2 Conclusion

This study demonstrated that place-based learning is a powerful tool for improving hostel residents' water conservation knowledge and attitudes. Students exposed to PBL showed significantly better understanding of water conservation practices and more positive attitudes toward sustainable water use. The findings confirm the effectiveness of experiential and context-focused learning approaches in environmental education.

The study revealed the importance of adopting learner-centered strategies such as PBL in university hostels and similar residential communities. By engaging students with their immediate environment, PBL promotes active participation, deeper understanding, and attitudinal transformation. Sustaining this approach may contribute significantly to long-term behavioral changes necessary for addressing water management challenges in institutional settings.

5.3 Recommendations

Based on these findings from this study the following recommendations are made:

1. University programs should incorporate PBL activities that expose students to real-life water conservation practices within their hostels and campus environments.
2. Continuous awareness programs, including workshops, campus tours, and interactive conservation demonstrations, should be implemented to reinforce knowledge and attitudes.

3. Partnerships between the university, local water authorities, and environmental NGOs should be strengthened to provide expert-led conservation projects and practical learning opportunities.
4. The University of Benin should invest in water-efficient facilities such as low-flow taps, leak-detection systems, and visible water-saving signage to support behavioral change.
5. Environmental clubs should be empowered to lead peer-to-peer campaigns, competitions, and hostel-based conservation challenges that encourage long-term behavioral engagement.
6. Future studies should examine long-term impacts of PBL and explore additional variables such as behaviour change, water usage patterns, and the influence of socio-cultural factors.

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APPENDIX

QUESTIONNAIRE

Research Topic: Impact of Place-Based Learning (PBL) on Water Conservation Practices Among Hostel Residents in the University of Benin

Introduction

This questionnaire is designed to gather information on students' knowledge, attitudes, and practices regarding water conservation in hostel environments. It also aims to explore the impact of **Place-Based Learning (PBL)**, a teaching method that connects learning to real-life environments and communities. PBL encourages students to apply classroom knowledge to practical issues around them, such as responsible water use, reducing wastage, and promoting sustainable conservation practices.

Your honest responses will contribute to research aimed at improving water conservation awareness and practices among students. All information provided will be treated with confidentiality and used strictly for academic purposes.

Section A: Demographic Information

(Please tick ✓ or fill where appropriate)

1. Gender: ☐ Male ☐ Female
2. Age: ☐ Below 18 ☐ 18–22 ☐ 23–27 ☐ Above 27
3. Level of Study: ☐ 100 ☐ 200 ☐ 300 ☐ 400 and above
4. Faculty/Department: _____
5. Do you currently live in a hostel? ☐ Yes ☐ No

Section B: Knowledge of Water Conservation

(Tick the option that best represents your response)

6. **What does water conservation mean?**

☐ a) Using water excessively

☐ b) Preventing wastage and using water efficiently

☐ c) Polluting water sources

☐ d) Ignoring water scarcity

7. **Why is water conservation important?**

☐ a) To prevent water wastage and shortage

☐ b) To increase water bills

☐ c) To make water dirty

☐ d) To waste school resources

8. **Major sources of water on campus include:**

☐ a) Boreholes

☐ b) Tap/Overhead tanks

☐ c) Wells

☐ d) All of the above

9. **What happens when taps are left running unnecessarily?**

☐ a) Water supply increases

☐ b) It contributes to water shortage

☐ c) It reduces hostel water bills

☐ d) Nothing happens

10**. How does conserving water help the university?**

☐ a) It reduces the cost of water supply

☐ b) It wastes less electricity

☐ c) It increases student expenses

☐ d) It has no real effect

11. **Water conservation is linked to:**

☐ a) Fashion trends

☐ b) Environmental sustainability

☐ c) Campus entertainment

☐ d) None of the above

12. **Which of the following causes water loss on campus?**

☐ a) Leaking pipes and taps

☐ b) Closed taps

☐ c) Clean storage tanks

☐ d) Proper maintenance

13. **Who plays a key role in promoting water conservation in hostels?**

☐ a) Only the university management

☐ b) Only the cleaners

☐ c) All students and staff

☐ d) No one in particular

14. **Which of the following actions helps to save large amounts of water?**

☐ a) Turning off taps after use

☐ b) Leaving taps to run continuously

☐ c) Washing clothes under running taps

☐ d) Ignoring water leaks

15. **Have you ever received any education or training on water conservation?**

☐ a) Yes, during classes or seminars

☐ b) Yes, through hostel campaigns

☐ c) No, but I would like to

☐ d) No, and I'm not interested

Section C: Attitudes Towards Water Conservation

(Kindly tick your level of agreement using the scale: **SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree**)

16. Water conservation should be a personal responsibility for all students. ☐ SA ☐ A ☐ D ☐ SD
17. Conserving water is just as important as conserving electricity. ☐ SA ☐ A ☐ D ☐ SD
18. I feel responsible for saving water in my hostel. ☐ SA ☐ A ☐ D ☐ SD
19. It is necessary to report leaking taps or pipes in hostels. ☐ SA ☐ A ☐ D ☐ SD
20. Students should be punished for wasting water. ☐ SA ☐ A ☐ D ☐ SD
21. Water conservation is only the responsibility of hostel management. ☐ SA ☐ A ☐ D ☐ SD
22. I am willing to change my daily habits to save water. ☐ SA ☐ A ☐ D ☐ SD
23. Place-based learning activities can improve students' awareness of water conservation. ☐ SA ☐ A ☐ D ☐ SD
24. Conserving water now will help ensure availability for future generations. ☐ SA ☐ A ☐ D ☐ SD
25. I am motivated to encourage others to adopt water conservation practices. ☐ SA ☐ A ☐ D ☐ SD

Thank you for your participation.