Using Environmental Education Approach to Enhance Future EFL Teachers' Language Green Skills and A Growth Mindset

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ABSTRACT

The present study aimed at investigating the effectiveness of using an environmental education approach to equip future EFL teachers with language green skills and a growth mindset. The study utilized the quasi-experimental research method (pretest-posttest control group design). Sixty participants enrolled in the basic education section at the Faculty of Education, Minia University were randomly assigned to two intact groups: a treatment group (n=30) and a non-treatment group (n=30). The participants in the treatment group were trained and instructed using an environmental education-based program designed by the researcher whereas their counterparts in the non-treatment group did not receive such training as they received regular instruction. Instruments of the study included a test of sustainability knowledge, a test of green knowledge, a scale of eco-select navigator, and a scale of a growth mindset. The findings revealed that the participants in the treatment group significantly surpassed their counterparts in the non-treatment group in the post-performance of the test of green knowledge, a scale of eco-select navigator, and a scale of a growth mindset. Thus, the environmental education-based program proved its effectiveness for developing language green skills and a growth mindset among future EFL teachers. Suggestions for further research and recommendations were also presented.

Keywords: environmental education approach, language green skills, a growth mindset, future EFL teachers

تعزيز المهارات اللغوية الخضراء والعقل النامي لدي معلمي المستقبل في اللغة الإنجليزية كلغة اجنبية من خلال مدخل التربية البيئية

اعداد

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استاذ المناهج وطرق تدريس اللغة الانجليزية المساعد

كلية التربية – جامعة المنيا

هدفت هذه الدراسة إلى التحقيق في فعالية برنامج قائم على التربية البيئية لتعزيز المهارات اللغوية الخضراء والعقل النامي لدي معلمي المستقبل في اللغة الإنجليزية كلغة اجنبية. استخدمت الدراسة المنهج البحثي شبه التجريبي حيث تم تقسيم ستين معلما مستقبليا في فرع اللغة الإنجليزية بشعبة التعليم الأساسي بكلية التربية -جامعة المنيا بشكل عشوائي إلى مجموعتين متجانستين تامتين :مجموعة تجريبية (30) ومجموعة ضابطة (30) وتم تدريب المشاركين في المجموعة التجريبية وتعليمهم باستخدام برنامج قائم على التربية البيئية من تصميم الباحثة، بينما لم يتلق نظراؤهم في المجموعة غير التجريبية مثل هذا التدريب حيث تلقوا التعليم المعتاد .اشتملت أدوات الدراسة على اختبار في الاستدامة البيئية، اختبار في المعرفة الخضراء، مقياس لتحديد الوعي البيئي، ومقياس العقل النامي. أظهرت النتائج أن المشاركين في المجموعة التجريبية تفوقوا بشكل ملحوظ على نظرائهم في المجموعة الضابطة في الأداء البعدي لاختبار المعرفة الخضراء، مقياس تحديد الوعي البيئي، ومقياس العقل النامي مما يدل على فاعلية البرنامج القائم على التربية البيئية كما تم تقديم اقتراحات لإجراء مزيد من البحث والتوصيات.

الكلمات المفتاحية: التربية البيئية، معلمي المستقبل في اللغة الإنجليزية كلغة اجنبية، المهارات اللغوية الخضراء، العقل النامي

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Introduction

One of the most critical issues affecting everyone globally is the environmental degradation of the planet. Global warming, deforestation, and water pollution are regularly featured in the news, thereby raising our awareness of the troubled state of Mother Earth. Recognizing the value of environmental education, language teachers will be in a unique position to promote environmental awareness while teaching English. Through integrating environmental ideas into English lessons, language educators would teach the language together with developing the learners' environmental awareness. Thus, learners would be empowered to act wisely.

While most educators recognize the value of environmental education, some may wonder how to integrate it into the curriculum in a way that remains objective and avoids current controversial topics. However, language educators may not feel as equipped to handle the scientific aspects of environmental issues. They also believe that they are like the public who do not understand the complexities of the environmental challenges. Though, one of teachers' goals should be enabling students to become informed about issues that intrinsically affect their lives. Due to its direct impact on all people's lives, equipping students with environmental knowledge would foster their sense of agency and decision-making in protecting our planet.

Environmental Education

In the late 1980s, in response to the changing world, important topics including human rights and peace education were embraced by all teachers all over the world and introduced into language classrooms. Nowadays, issues related to the environment (e.g., global warming, air pollution, biodiversity) are interlinked with fundamental human rights. Climate change is causing food and water scarcity, displacement, and disease, threatening basic human rights and security. This illustrates why global climate change represents one theme of potential interest to language learners all over the world. Through the challenges that our

planet faces today, raising students' environmental awareness and teaching them about these issues are pertinent now (Hauschild, Poltavtchenko & Stoller, 2012: 3).

Moreover, the U.S. National Environmental Education Foundation (NEEF, www.neefusa.org) further supports such educational agendas by suggesting that environmental education can improve students' academic achievement in science, reading, and writing in addition to their critical thinking skills, motivation, and attitudes about learning. They suggest that integrating environmental education into second or foreign language instruction can be accompanied by additional advantages for our students. Additionally, The NEEF describes three levels of environmental education: (1) environmental awareness—that is, general familiarity with key environmental issues; (2) personal conduct knowledge, which translates awareness into action to preserve the environment; and (3) environmental literacy, which enables students to learn underlying principles and gain skills for carrying out their own hands-on projects (Kudryavtseva, Barsuk, & Frolova, 2022 and Hauschild et al., 2012).

Recently, though, as concerns for the environment have increased worldwide, it has become easier to find instructional materials for the language classroom. Through language textbooks, videos, documentaries, or even online resources, where available, language educators can find a wealth of environment-related resources. These can be adapted to meet their students' content- and language-learning needs. Interestingly, environmentally friendly practices (inside and outside the classroom) naturally lend themselves to meaningful language use. While it may not appear that waste production promotes language practice, classroom discussions about the importance of green habits lead to authentic communication as students express their thoughts and ideas.

Green Skills and Language Learning

Education is the gate for sustainable development. It introduces knowledge and skills that improves humans' capacity to address environmental, social and economic issues. In our fast-changing world, green skills have become important for nations to stay ahead of environmental issues and opportunities through the global and political context. Technological advancements, climate change, high carbon emissions, potential food scarcity and widespread diseases necessitate new shifts in the way of our lives. To ensure sustainable development and address urgent environmental concerns all over the world, education

systems must prioritize attention to green skills development. This means that there is a need for special learning material to match these emerging new skills. Embedding green skills into adequate learning resources becomes a must. Such learning content could serve as a means for enhancing language communicative competence as a step towards language mastery. Meanwhile, introducing other job-related tasks would encourage learners to use the language learnt into practice through simulated work scenarios (Kudryavtseva et al. ,2022).

Green skills are all about minimizing environmental impact and directing economic change towards cleaner, more resilient, and efficient economies. Enhancement of such skills would ensure environmental sustainability as well as appropriate work conditions. Green skills, according to Kudryavtseva et al. (2022) and Ramli, Rasul and Affandi (2019) encompass three areas. These areas are knowledge, practical skills and positive attitudes towards environmental sustainability. Hence, the application of these skills in different industries, businesses, and communities would support building a more sustainable future for both the environment and society.

Due to the recent importance of introducing green skills in education, researchers of environmental issues are starting to consider means of integrating them into the learning process. Fan (2016) and Kudryavtseva et al. (2022) suggested a variety of teaching methods and activities to equip learners with these skills. Green skills can be interpreted into practical conscious actions which should reflect personal awareness. Consequently, all education programs should make them a core curriculum component.

This gradual integration of green elements into education would enable teachers to emphasize the great impact of these skills on learners' future lives. Greening education may involve comparing environmental issues across locations, and exploring concepts like carbon footprints, air and water pollution, global warming, and climate change. Additionally, it may involve creating projects that raise awareness (e.g. environmentally related posters, videos, online posts). Developing environmental consciousness through green skills would pave the way for both a more sustainable world and potential career advantages.

Growth Mindset

In our recent dynamic society, educational institutions should move beyond basic education to empower learners with creativity, confidence,

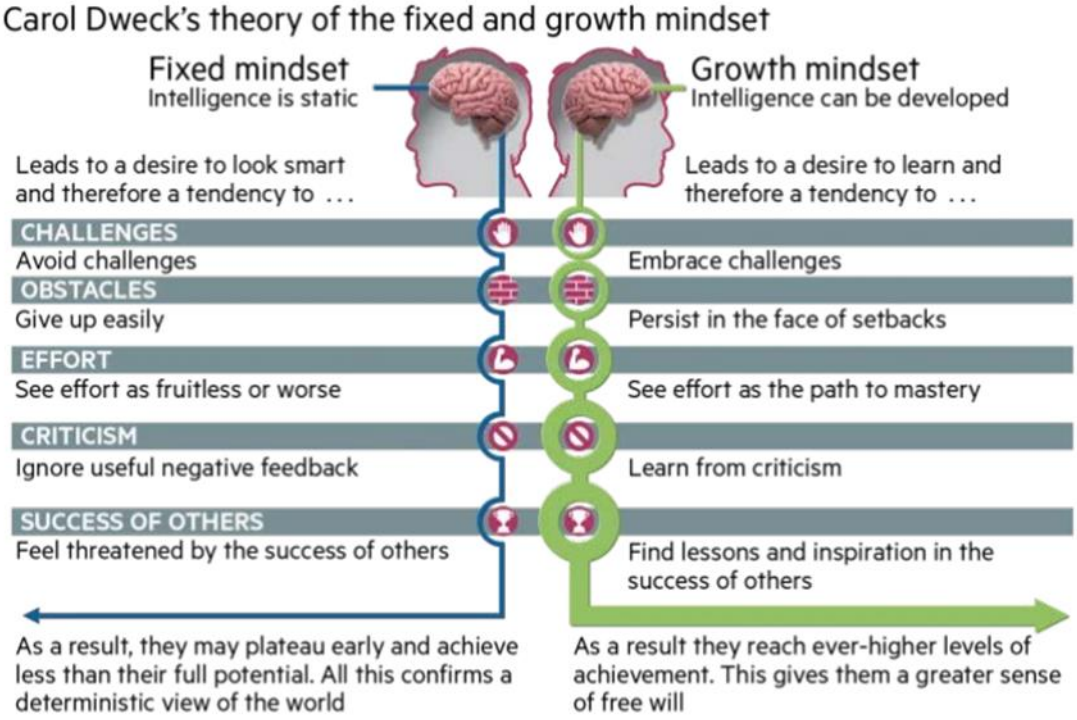
independent thinking, besides emotional intelligence. Learners need to learn to accept changes, handle challenges, endure pressures, and cope with society's demands. This requires teachers to become facilitators of growth and development. They need to foster resilience, improve critical thinking skills while embracing ethical challenges and conflicts and attempt to solve them in their work.

Carol Dweck (2000), a Professor of Psychology at Stanford University, identified personality traits that support young people in becoming reflective, resilient and independent learners. Through her work on learning styles and attitudes, she identified two categories of mindsets: growth and fixed. Recent research on mindsets (Reyes, 2023 and Tirri, 2021) emphasized the role of growth mindset in empowering individuals to adapt and learn in various social and professional settings. Those with a growth mindset can reshape their thinking and behavior to overcome obstacles towards achieving learning goals. Growth mindsets view intellectual skills as malleable qualities that can be improved through effort and experience. Conversely, a fixed mindset considers intelligence as an innate trait that nothing can be done to change it. This can hinder growth, personal development and motivation (Reyes, 2023 and Whyte, 2016).

Dweck proposed a mindset paradigm that encompasses a spectrum from fixed to growth mindsets. This spectrum highlights how people can hold different beliefs about their capabilities across various aspects of life. Those with a fixed mindset maintain a fear of failure and avoidance of challenges. Conversely, a growth mindset fosters a belief in welcoming challenges and setbacks as opportunities for growth. This paradigm proved to be an incredibly powerful tool in education (Reyes, 2023). Figure 1 clearly shows Dweck's paradigm of mindsets.

Figure*1*

Dweck's Theory of Growth and Fixed Mindset



Source: *Herreño Contreras & Salamanca González, 2023:15).*

Both growth and fixed mindsets exist. Growth mindsets enable people to become critical thinkers and constantly evaluate themselves, believing their abilities can develop. Fixed mindsets, on the other hand, lead to extreme reactions, either positive or negative. People with fixed mindsets believe that intelligence is fixed and unchangeable, and thus hindering their growth and improvement. Students' mindsets beliefs affect the way they perceive daily classroom situations. A fixed mindset leads people to consider challenges as threats exposing their lack of ability. A growth mindset, on the other hand, enables people to view obstacles as exciting opportunities for developing their potential (Herreño Contreras & Salamanca, 2023 and Viña, Mamalampay, Mascud, Liscano & Quiñones, 2022).

Moreover, people's mindsets shape the way they handle challenges and setbacks. People with fixed mindsets consider their successes and failures as reflections of their inherent and self-believed worth. Obstacles and challenges become threats to their self-esteem. A growth mindset, on the other hand, accepts failure and views setbacks as opportunities to learn, grow and improve. Challenges motivate people to work harder and develop smarter strategies to achieve their goals (Lee et al., 2023).

In relation to thinking, learning and intelligence aspects, there is a distinction between fixed and growth mindsets. Fixed mindsets emphasize unchangeable levels of intelligence, thinking, and existing skills. This means that there is nothing else to be learnt or changed. They also view feedback as source of threat and criticism. Conversely, growth mindsets foster a love for continuous learning. This means that information is always sought, actively analyzed to be used for improving professional life. This enables persons to become more adaptable and successful in their lives (Herreño Contreras et al., 2023).

Growth Mindset and Language Instruction

Teachers, like all people, encounter challenges in teaching during their professional life and development. These challenges can be tackled from different mindset perspectives. Different mindsets relate to different dimensions such as experiences, background, personality traits, and points of views. A growth mindset allows people to address obstacles and challenges as opportunities to learn and improve. Fixed mindsets, on the other hand, usually lead people to frustration and limit their effectiveness. Some teachers are open to change and adopt growth mindsets, whereas others resist change preferring to remain static. The current demanding nature of teaching creates continuous stressful situations, but the way teachers handle this stress (positively or negatively) impacts not only their own well-being but also their interactions with students.

Dweck's (2006) concept of growth mindset is considered an effective resource to enable teachers to navigate challenges, manage pedagogical problems to succeed and grow professionally. It is a reflective approach that equips teachers with tools for success and ongoing development. Teachers with a growth mindset consider themselves as capable of change, learning and managing difficult situations. They focus on learners' learning, appreciate effort, consider mistakes as natural phases in learning, and emphasize mastery -oriented goals. In contrast, those with fixed mindsets care more about appearing good emphasizing performance goals. They view failure as signs of weakness (Tirri, 2021). Thus, teachers' implicit beliefs affect the way they teach and think, leading to greater enjoyment and engagement in their work (Herreño Contreras et al., 2023 and Yeager & Dweck, 2012).

Embracing a growth mindset, teachers would attempt to understand their students' individuality. They would be able to provide them with emotional support and help them to discover their own learning strategies. This pedagogy emphasizes four core aspects: (a) tailoring instruction to individual needs, (b) focusing on effort and progress over perfection, (c) persisting through challenges, and (d) encouraging students to focus on the learning process itself. They would promote both mastery and process-focused thinking (Tirri, 2021:330). Growth mindset is a real toolbox for success. It supports taking personal risks, setting challenging goals, reducing stress, and strengthening relationships. This also involves higher motivation, effective brainpower, and higher achievement levels. Ultimately, allowing all students, especially gifted ones, to view mistakes as steppingstones and embrace challenges (Tirri, 2021 and Reyes, 2023).

The Learning Pit, created by Nottingham as inspired by Dweck's growth mindset research enables teachers to create a challenging learning context. Teachers would be able to design lesson plans that target resilience, confidence, and creativity. This learning pit relies on six key principles: (a) asking questions and expressing confusion freely and openly, (b) participating actively in the learning process through guided inquiry, (c) making connections between ideas for the sake of deep understanding of introduced concepts, (d) focusing on applicable knowledge and skills beyond memorization, (e) sharing responsibility among teachers and students to enjoy a thoughtful, supportive, and open-minded environment, and (f) valuing reflection and discussion (Tirri, 2021 and Whyte, 2016). Thus, educators should focus on the concepts of mindset and motivation to improve their students' learning. In other words, approaches that focus on ability and discourage student agency are likely to foster a fixed mindset (Herreño Contreras et al., 2023; Reyes, 2023 and Yu, Kreijkes & Salmela-Aro, 2022).

Language mindset addresses personal beliefs about the feasibility of language learning. It deals with individual viewpoints about whether language learning is a fixed ability or something that can be developed and improved over time. Moreover, learners' beliefs about intelligence (fixed vs. growth mindset) shape how they perceive daily classroom experiences as threats or opportunities for development (Liu et al., 2023 and Reyes, 2023). Aspects like confidence, well-being, autonomy, speaking anxiety, perseverance, and willingness to communicate affect a learner's mindset. Teachers with a growth mindset are those who are flexible, enjoy their work, utilize new tactics, strive for greater effort,

indulge greatly in their work, and believe in personal development. Those teachers, interestingly, are more likely to foster success in their students. On the contrary, teachers with a fixed mindset consider talent as unchangeable and personality traits as fixed. They really struggle to create a positive and supportive learning environment (He, Iskhar, Yang & Aisuluu, 2023; Reyes, 2023 and Rammstedt, Grüning & Lechner, 2022).

Moreover, previous studies explored the positive relationship between students' mindset and their success in language learning. The concept of mindset, according to Mercer et al. (2010, as cited in Reyes,2023:4), has an influential role in ELT context. Learners with a growth mindset embrace high levels of cognitive and psychological engagement, self-confidence in their abilities to improve with effort, personal power to achieve higher goals, and ultimately achieve better results in writing and overall language acquisition. Other studies highlighted the role of English language teacher to create a growth-supportive context through integrating growth principles into daily interactions and classroom practices. This can happen through providing positive feedback, adjusting lesson plans and strategies, and providing suitable assistance to foster their motivation and mindset. Cultivating a growth mindset in both students and teachers is important to exploring language learning potential (Reyes, 2023 and Viña, Mamalampay, Mascud, Liscano & Quiñones, 2022).

Review of Literature and Related Studies

Theoretical Background

Positive psychology (PP), introduced by Seligman (2006), rooted in philosophical psychology. PP appeared as a counterpart to traditional, cognition-focused education which decreases the role of emotions in second-language acquisition (SLA). It presents an alternative to student-centered education emphasizing emotions for better personal growth. PP encourages embracing life's positive aspects while acknowledging challenges and setbacks. Moreover, it focuses on positive feelings, personality traits, and human strengths and capabilities. This approach has gained prominence due to its capacity to improve both language teachers' and students' effectiveness, resilience, and motivation. It even attempts to reduce the impact of negative emotions leading to enhancing individuals' quality of life (He et al.,2023).

Related Studies

Green Skills and English Instruction

Kudryavtseva et al. (2022) attempted to specify the most effective ways of enhancing green skills in Maritime English course. Surveying students, educators, and professionals of Kherson State Maritime Academy (KSMA), they discovered a gap between the green skills needed aboard ship and those being developed in current programs at MET institutions. In addition, most maritime professionals do not consider graduates to always possess the relevant skills to provide safety and increase efficiency of this sector. The study also revealed a lack of consensus on what exactly constitutes green skills in the maritime industry.

In their 2019 study, Ramli, Rasul, and Affandi explored how to incorporate green skills into teaching and learning for Technical and Vocational Education and Training (TVET) professionals. They surveyed 111 teacher trainees and 38 lecturers to identify 14 practical applications of green skills. Their findings suggest that these applications should be woven into the entire TVET curriculum, from learning materials and teaching methods to institutional policies and practices, ultimately promoting environmental sustainability.

Growth Mindset and English Language Learning

A recent study by He et al. (2023) examined how different qualities influence well-being in teachers. They examined growth mindset, mindfulness, grit, and well-being in 547 Chinese EFL teachers. Data was collected through validated measures of growth mindset, mindfulness, grit, and occupational well-being. Findings showed that both teacher growth mindset and teacher grit have a direct positive influence on teacher sense of well-being at work.

A study by Herreño Contreras & Salamanca (2023) explored the mindsets of four English teachers at tertiary education. For four months, the researchers conducted a descriptive case study to examine how these teachers handled professional challenges. They also considered the relationship between those teachers' mindsets and their actual performance. Data from surveys, journals, and interviews showed that the teachers tended to view these difficulties as opportunities for learning and development showcasing flexible mindsets. Interestingly, the findings also revealed a hybrid mindset among the teachers. This means their tendency to self-reflect on teaching practices was not constant, and factors like resistance to change, unexpected teaching scenarios, stress, mood, and uncertainty all played an effective role.

Two studies by Lee et al. (2023) explored the link between growth mindset and teacher well-being. The first study compared teachers with growth mindsets to those without. They found that teachers with a growth mindset enjoyed a greater tendency to accept new teaching initiatives, especially when resources and support were limited. This suggests that a growth mindset fosters adaptability even in challenging circumstances. Their second study examined teachers' mindset during the COVID-19 pandemic school closures and the shift to online learning. Similarly, teachers with a growth mindset felt more confident and self-efficacious in mastering online teaching methods. Their confidence, along with a growth mindset, contributed to a higher life satisfaction. Additionally, they managed to support their students' learning and well-being during that difficult time.

A study by Liu et al. (2023) investigated how different qualities influence motivation and satisfaction among 486 Chinese EFL volunteer teachers. They surveyed those teachers online to examine the relationships between four key factors: a growth mindset, teaching enjoyment, work engagement, and perseverance (grit). Results indicated that enjoyment of teaching, grit, and a growth mindset all directly contributed to the teachers' work engagement. Interestingly, the study also revealed that enjoyment of teaching indirectly affected work engagement through the mediating factor of grit. This suggests that grit plays a crucial role in translating both enjoyment and a growth mindset into higher work engagement.

In a qualitative study by Reyes (2023), twelve pre-service English teachers were interviewed to explore their beliefs about a strong growth mindset and its impact on their teacher education program. The researcher used semi-structured interviews guided by a researcher-made validated questionnaire. The findings revealed that the participants associated a strong growth mindset with several key qualities: focus, a positive attitude, alternative plans, and mental strength.

A study by Viña et al. (2022) investigated the growth mindset of college students learning English in an online setting. Sixty students from various departments were surveyed using a researcher-designed questionnaire at Notre Dame of Midsayap College. Findings indicated that the students generally had a growth mindset towards English language learning. The study also highlighted factors like motivation, constructive criticism, a

supportive environment, and dedicated effort as key contributors to their English language learning success.

A previous study by Yu et al. (2022) explored how teachers' beliefs, practices, and school environment influence students' mindsets. They examined data from over 2200 ten-year-old-Finnish students, along with information from 358 teachers and 65 principals. The findings suggested a connection between growth mindset and certain teaching methods and school philosophies. Students in classrooms where teachers utilized guided inquiry and group work were more likely to exhibit a growth mindset. Similarly, schools that prioritized students' social and emotional development fostered a growth mindset in their students. The study also revealed an interesting contrast: students in classrooms where teachers assigned tasks based on ability levels tended to have more fixed mindsets.

Commentary

The current absence of previous studies on enhancing students' green mindset in the process of learning English indicates the necessity to develop transitional environmental content as additions to training modules. Similarly, most of the mindset interventions have been targeted at students. Interventions to teachers are rare and there is a need to design and actualize them. Previous studies highlight the need to educate teachers with the growth mindset practices. Thers is also a need for curriculum revisions, industry collaboration to ensure relevant skills, and potentially standardized definitions of green skills to effectively equip students for a future demanding environmental responsibility and practical skills.

Context of the problem

There is currently a mismatch between student experience and most course materials. Young people are engaged in climate activism and environmental issues through social media. They strive to understand the interconnection of global issues with other issues, such as social and racial justice. Textbooks, however, generally isolate the environment into a single isolated chapter, failing to embrace this interconnectedness (Reyes, 2023; Kudryavtseva et al., 2022; Viña et al.,2022; Yu et al. ;2022 and Ramli et al., 2019). Language classrooms provide a great opportunity to raise awareness of the environmental crisis, connect learners with nature, and ignite their curiosity about the planet we share. These types of classes do not require teachers to be climate experts to inspire curiosity

and encourage critical thinking. Since, globalization has made nations more interconnected and interdependent. so even basic language skills can be used to discuss environmental issues and develop critical thinking. Gradually, teachers can support learners' effort and progress, not just perfect answers. This would lead learners to embrace challenges and view mistakes as learning opportunities. Through considering themselves as agents of change, a growth mindset would be supported and fostered.

To validate the first aspect of the problem of the study, potential shortcomings in preparedness to addressing environmental issues among future EFL teachers, the researcher designed and administered a test of sustainability knowledge to 30 future EFL teachers enrolled in the basic education section in the second semester of 2022-2023 academic year. This test was used to determine knowledge gaps in sustainability concepts and environmental issues. The results revealed a gap in their language green knowledge and overall environmental awareness among the participants.

To explore the second aspect of the study – whether future EFL teachers exhibited a growth or a fixed mindset - the researcher designed and administered a growth mindset scale to the same group of 30 EFL students in the second semester of the 2022-2023 academic year. The results suggested that the participants generally leaned towards a fixed mindset. It is clear for English educators that English contributes to their students' education, economic status, and competitiveness. Future teachers should then be supported to become active learners themselves so they can model this for their students. Hence, the culture of growth mindset should be nurtured in education.

Statement of the problem

Teachers' effective professional development goes together with addressing global issues and fostering a growth mindset. Teachers need to be lifelong learners who embrace challenges. This means continuously seeking new methods, refining their teaching strategies, and considering negative situations or setbacks as opportunities for growth. A growth mindset empowers them to analyze challenges and explore innovative solutions, turning even mistakes into valuable learning experiences. Thus, the current study attempted to resolve this dilemma by suggesting an environmental education-based program for

fostering future EFL teachers' language green skills and a growth mindset.

Questions of the Study

The present study attempted to answer the following question: How can an environmental education-based program be designed to equip future EFL teachers with language green skills and a growth mindset?

More specifically, the following questions can be branched out:

1. What is the effect of using an environmental education-based program on enhancing future EFL teachers' language green skills?
2. What is the effect of using an environmental education-based program on enhancing future EFL teachers' growth mindset?

Aim of the Study

The purpose of this quantitative study was to investigate the impact of using an environmental education-based program on equipping future EFL teachers with language green skills and a growth mindset?

Hypotheses of the Study

The present study attempted to test the following hypotheses:

1. There would be a statistically significant difference between mean scores obtained by the treatment and the non-treatment groups on the post-performance on the test of green knowledge (favoring the treatment group) with a p-value of 0.01 or lower.
2. There would be a statistically significant difference between mean values obtained by the treatment and the non-treatment groups on the post-performance on the scale of eco-select navigator (favoring the treatment group) with a p-value of 0.01 or lower.
3. There would be a statistically significant difference between mean values obtained by the treatment and the non-treatment groups on the post-performance on the scale of growth mindset (favoring the treatment group) with a p-value of 0.01 or lower.

Significance of the Study

The use of environmental education with future EFL teachers is hopefully expected to:

- enable EFL teacher trainers and institutions to improve curriculum design integrating environmental education and growth mindset principles through incorporating new teaching methods, materials, and assessments.
- enhance EFL teacher quality through equipping them with language green skills and a growth mindset to effectively teach English while fostering environmental awareness and a love for learning in their students.
- increase EFL teachers' job prospects as graduates who can integrate environmental themes into their English language instruction would be more attractive to employers seeking teachers with these skills.
- improve future EFL teachers' teaching effectiveness by equipping them with the necessary skills and mindset to teach English in an engaging and environmentally conscious way.
- raise both EFL teachers' and learners' environmental awareness, potentially leading to positive environmental actions.
- provide EFL learners with richer learning experience from teachers who can effectively combine language learning with environmental education fostering critical thinking skills and global citizenship.
- enable policymakers and educational authorities to make policy decisions related to incorporating environmental education into EFL curricula, upgrading the entire educational approach, moving to greening course syllabi, and promoting a growth mindset in language learning.
- encourage policymakers and educational authorities to support United Nations sustainable development goals for education and environmental sustainability.
- raising educational institutions' awareness to use environmentally friendly technologies, segregate garbage, use solar batteries, promote education on green skills and instruct the personnel to develop them.

Delimitations of the study

The present study was delimited to the following elements:

1. The participants of this study were third year English majors enrolled in the basic education section of Minia University's Faculty of Education in the first semester of the academic year 2023/2024.
2. There is no balance between male and female third year English majors at the basic education section at the Faculty of Education in both the treatment and the non-treatment groups. This is due to the sex ratio of this population.

3. Growth mindset scale consists of some dimensions: self-efficacy and persistence, learning orientation (mental strength), ongoing process for growth mindset, focus strategies, and keeping motivation.

Definition of terms

Environmental Education

- Kusherbaeva (2013: 251) defines environmental education as the development of environmental awareness, a humanist attitude to nature, and a feeling of responsibility for its destiny, as well as principles of rational use of natural resources, i.e. establishment of such relations between society and nature when solving social and economic tasks so as not to damage the environment.

Environmental education in English language teaching

- It is defined procedurally in this study as a multi-step process that involves selecting engaging environmental themes for different language learning activities to develop learners' critical thinking skills about environmental issues.

Green Skills

- The European Centre for the Development of Vocational Training (CEDEFOP, 2014 as cited in Ramli et al. ,2019: 186) defines green skills as skills needed in a low-carbon economy that will be required in all sectors and at all levels in the workforce, as emerging economic activities create new (or renewed) occupations.
- Ramli et al. (2019: 187) defined green skills as one of the strategic thrusts that will enable countries to stay ahead of environmental challenges and opportunities in a fast-changing global and political landscape.
- In another definition, Ramli et al. (2019: 190) defined green skills as skills, knowledge, and attitudes needed by people to support and promote sustainable social and economic development, and to improve environment development friendly in business and communities.
- This study adopted the second definition of green skills by Ramli at al. (2019: 190).

Language Green Skills

- This study defines language green skills as language abilities that combine environmental knowledge with effective communicative activities to raise awareness of environmental advocacy and inspire action.

Growth mindset

- It is defined by Tirri (2021: 332) as a morally sound stance for an ethical teacher who wants to contribute to students' holistic development.
- Vina et al. (2022:107) described a growth mindset as the belief that individual potential may always be developed through hard work.
- Similarly, Rammstedt et al. (2022:84) defined it as a belief that personal characteristics, specifically intellectual ability, are malleable and can be developed by investing time and effort.

- It is procedurally defined in this study as a non-cognitive aspect of a person's perception that intelligence and other intellectual skills can be developed via study and effort.

Language Mindset

- This study drew on the definition of language mindset introduced by Liu et al., (2023: 3) that focuses on a person's beliefs about their inherent ability to learn languages. This means that whether someone thinks language learning is a fixed ability or something that can be developed and improved over time.

Method

Research Design

The present study utilized quasi-experimental research design. The pre-post control group design (Hatch and Farhady, 1982) was used in designing and conducting the study. A treatment group and a non-treatment group were exposed to pre and post means of getting data. The treatment group was only instructed and trained using an environmental education –based program while the non-treatment group did not receive such training.

Participants of the Study

Sixty (60) future EFL teachers enrolled in the basic education section of Minia University's Faculty of Education in the academic year 2023-2024 were recruited for this study. The participants were randomly divided into two equal intact groups, treatment, and non-treatment. Homogeneity was established between participants in both groups at the entry level before the intervention as follows:

Age.

All the participants recruited in both groups were aged between 20 and 22 at the beginning of the study.

Linguistic background.

This study involves two groups of participants who share a similar educational background. All participants completed 12 years of English language education, from primary school through secondary school, in Minia Governorate, Egypt. In addition to that they are all third year English majors enrolled at the basic-education section in Minia University's Faculty of Education.

Pedagogical background

All the participants in both groups are future EFL teachers at the Faculty of Education.

Instructor

The researcher taught only the treatment group by herself while the non-treatment group was taught by another instructor. This was done to avoid contamination of the procedures of teaching the non-treatment group and to keep the two groups intact.

Variables of the Study

The independent variable.

The use of an environmental education-based program.

The dependent variables.

The level of English green skills and the level of a growth mindset.

Instruments of the study

To fulfill the study aims, a test of sustainability knowledge, a test of green knowledge, a scale of eco-select navigator and a scale of a growth mindset were utilized.

Exploratory study instruments

1- A test of sustainability knowledge

Purposes of the test. Determining the participants' current knowledge about sustainability concepts to address areas of knowledge gaps. This allows tailoring the instructional program with its teaching methods and activities to the level of future EFL teachers enrolled at the basic-education section in Minia University's Faculty of Education.

Construction of the test. (a) A review of existing literature was conducted to identify established methods for assessing sustainability concepts, (b) Stating the objectives of the test, (c) An initial version of the test was created, containing 15 multiple-choice questions, (d) Evaluating

the preliminary form of the test by a jury of 5 TEFL experts. Their feedback ensured the test's alignment with the stated objectives and its appropriateness for the target population, (e) the test was revised and finalized. The final version consisted of 10 multiple-choice questions with clearly defined answer options.

Validity of the test. A jury of 5 TEFL experts was asked to approve the validity of the test. They approved its face validity, suitability and appropriacy for the study participants.

Administration of the test. The test was administered to 30 future EFL teachers enrolled in basic education section in Minia University's Faculty of Education to determine their knowledge in relation to sustainability concepts.

Results. Analyzing the results obtained from the future EFL teachers on the test of sustainability concepts showed that the average scores for the students was (2.54) with a standard deviation (0.89). The difference between the overall mean and the students' mean was (7.46), and the percentage of correct students' responses was (25.4%). This is shown in table 1.

Table 1

***Means, standard Deviations for the test of Sustainability Concepts* (N-30)**

Test Total Score	Means	Standard Deviation	Means dif.	Percent of correct responses
10	2.54	0.89	7.46	25.4%

This overall low percentage of correct answers signifies a substantial weakness in the knowledge of sustainability concepts for future EFL teachers. This necessitates a considerable evaluation of the current teaching methods and the exploration of innovative activities to enhance their sustainability concepts and green knowledge. This means there is a need for additional education and resources to confidently integrate green knowledge into their future classes.

2- A scale of a growth mindset

Purposes of the scale. Determining the participants' beliefs in their abilities to learn and improve (growth mindset) to address gaps in both of their confidence and persistence levels during facing difficulties and challenges through their learning journey. This allows aligning the instructional methods and activities in the applied program with the needs of future EFL teachers enrolled at the basic-education section in Minia University's Faculty of Education.

Construction of the scale. (a) A review of existing literature was conducted to identify established techniques for assessing the concept of a growth mindset, (b) Stating the objectives of the scale, (c) An initial version of the scale was created, a 12-item in a 5-point Likert scale capturing three dimensions of a growth mindset, (d) Evaluating the preliminary form of the scale by a jury of 5 TEFL experts. Their feedback ensured the scale's alignment with the stated objectives and its appropriateness for the target population, (e) Revising the scale to reach its final version. The final version consisted of an 8-item in a 5-point Likert scale capturing two dimensions of a growth mindset.

Validity of the scale. A jury of 5 TEFL experts was asked to approve the validity of the scale. They approved its face validity, suitability and appropriacy for the study participants.

Administration of the scale. The scale was administered to 30 future EFL teachers enrolled at the basic education section in Minia University's Faculty of Education to determine their persistence and confidence levels in overcoming challenges and obstacles through their learning.

Results. Analyzing the results obtained from the future EFL teachers on the scale of a growth mindset showed that the average participant response values was (8.34) with a standard deviation (1.57). The difference between the overall mean values and the students' mean values was (31.66). This suggests a limited understanding of a growth mindset concept among future EFL teachers. This necessitates a critical evaluation of current teaching methods and exploration of innovative activities to cultivate a growth mindset within this group. This is shown in table 2.

Table 2

Means, standard Deviations for the scale of a Growth Mindset (N-30)

Scale	Total Score	Means	Standard Deviation	Means dif.
	40	8.34	1.57	31.66

B- Measuring Instruments

1. A Test of Green Knowledge

Purpose of the test. A test of green knowledge was designed by the researcher to future EFL students enrolled in the basic education section in

Minia University's Faculty of Education to gauge their knowledge of environmental issues and concepts, to ensure equality of the participants in the treatment and non-treatment groups through piloting, and to measure the degree of improvement of the participants in both groups on

their knowledge of the targeted green aspects after finishing the intervention.

Construction of the test. It is a test of green knowledge. It consists of only one section. It includes 40 multiple choice questions with one point awarded per each correct multiple-choice answer.

Instructions for the test. The instructions of the test are written in English. They are brief and easy to understand. They include information about the purpose of the test, the way of recording the answers and the time allowed to complete the test.

Piloting the test. A pilot run was conducted with a mixed-gender group of 30 future EFL teachers enrolled in the basic-education section in Minia University's Faculty of Education during the second semester of the 2022-2023 academic year. The pilot test determined an average completion time of 60 minutes, based on the total time taken by all participants divided by the number of participants (30).

Validity of the test.

1. **The face validity of the test**.

It was determined by submitting it to a panel of five TEFL experts who evaluated it based on three key criteria: clarity of language in the test items, alignment with the program's learning objectives, and appropriateness for the target student population (30 future EFL teachers at the basic education section). The experts feedback and recommendations were incorporated to refine the test into its final form.

2. **The internal consistency of the test**.

The same piloting sample (30 future EFL teachers at the basic education section enrolled in Minia University's Faculty of Education) took the test. The internal consistency of the individual items was calculated. The value of the correlation coefficient is (0.856). It is significant at (0.01) level and considered acceptable.

Reliability of the test.

Establishing the reliability of the test was done during piloting. The same piloting sample took the test. The reliability coefficient of the test was determined using Alpha Cronbach coefficient. The alpha coefficient of the whole test is (0.845) which is considered acceptable as shown in table 3.

Table 3

The Cronbach. Alpha's Reliability Coefficient of the test

Test items	Total	Means	Variance	Standard Deviation	Alpha
40 items		35.68	18.65	1.58	0.845*

Note. *. Alpha is significant at the level (0.01).

Cohen et al. (2007:506) point out that the alpha coefficient is considered reliable if they range from 0.70 to 0.90. Thus, the reliability coefficient of the test is considered within the acceptable range.

Item analysis. It evaluates the effectiveness of the items and of the test. ***Index of difficulty***. Analysis of the responses to individual items was calculated to determine item difficulty for the test. The difficulty of the items is understood as the proportion of the persons who answer a test item correctly. The index of difficulty of this test ranged from 0.55 to 0.78, which is considered acceptable.

Item discrimination. It is the ability of the item to differentiate more knowledgeable students from the less ones. To calculate knowledge, the top scoring students are separated from the bottom scoring students and then their response patterns would be compared. It was found that the items had a positive discriminating power. None of the items had a zero-discriminating power. The power of discrimination of the test ranged from 0.20 to 0.25 which is considered acceptable.

Test time Allocation. Time taken by each student was recorded, divided by the whole number of the participants (30) who took the test, which was found to be 60 minutes. Thus, the testing time was 60 minutes.

2- A Scale of eco- select navigator

Purpose of the scale. A scale of eco- select navigator was designed by the researcher to future EFL teachers enrolled in the basic education section in

Minia University's Faculty of Education to gauge their environmental consciousness, to ensure equality of the participants in the treatment and non-treatment groups through piloting, and to measure the degree of improvement of the participants in both groups on their understanding and commitment to the targeted green aspects after finishing the intervention.

Construction of the scale. It is a scale of eco-navigator to measure future EFL teachers' environmental consciousness. It consists of 10 different scenarios with 3 different options for each scenario to assess how the participants consider environmental factors in their daily lives. These options are ranked on a 3-point Likert scale ranging from the most eco-friendly choice to somewhat green-aligned to the least.

Instructions for the scale. The instructions of the scale are written in English. They are brief and easy to understand. They include information about the purpose of the scale, the way of recording the answers and the time allowed to complete the scale.

Piloting the scale. A pilot run was conducted with a mixed-gender group of 30 future EFL teachers enrolled in the basic-education section in Minia University's Faculty of Education during the second semester of the 2022-2023 academic year. The pilot scale determined an average completion time of 25 minutes, based on the total time taken by all participants divided by the number of participants (30).

Validity of the scale.

1. The face validity of the scale.

It was determined by submitting it to a panel of five TEFL experts who evaluated it based on three key criteria: clarity of language in the scale items, alignment with the environmental education-based program's learning objectives, and appropriateness for the target student population (30 future EFL teachers at the basic education section). The experts' feedback and recommendations were incorporated to refine the scale into its final form.

2. The internal consistency of the scale.

The same piloting sample (30 future EFL teachers at the basic education section enrolled in Minia University's Faculty of Education) took the scale. The internal consistency of the individual scenarios was calculated. The value of the correlation coefficient is (0.758). It is significant at (0.01) level and considered acceptable.

Reliability of the scale.

Establishing the reliability of the scale was done during piloting. The same piloting sample took the scale. The reliability coefficient of the scale was determined using Alpha Cronbach coefficient. The alpha coefficient of the whole scale is (0.805), which is considered acceptable as shown in table 4.

Table 4

The Alpha Cronbach 's Reliability Coefficient of the scale (N=30)

Scale Total scenarios	Means	Variance	Standard Deviation	Alpha
10	20.65	16.42	2.74	0.805*

Note. *. Alpha is significant at the level (0.01).

Scale time Allocation. Time taken by each student was recorded, divided by the whole number of the participants (30) who took the scale, which was found to be 25 minutes. Thus, the testing time was 25 minutes.

3- A Scale of a growth mindset

Purpose of the scale. A scale of a growth mindset was designed by the researcher to future EFL teachers enrolled in the basic education section in

Minia University's Faculty of Education to gauge their current mindset, to ensure equality of the participants in the treatment and non-treatment groups through piloting, and to measure the degree of improvement of the participants in both groups on their beliefs in their abilities to learn, grow, and overcome challenges and obstacles after finishing the intervention.

Construction of the scale. The researcher developed a 24- indicator scale of a growth mindset. The scale targets five criteria and uses positive and negatively worded indicators (indicator 8) to pinpoint a growth mindset. Participants rate their agreement with each indicator on a 5-point Likert scale. The scale ranges from "strongly disagree" (1 point) to " strongly agree" (5 points). This translates to a maximum possible score of 120. This means that a higher score corresponds to a stronger growth mindset, detailed in table 5.

Table 5

The criteria and indicators of the scale of a growth mindset

No.	Scale Domains	No of items
1	Self-efficacy and persistence	4
2	Mental strength	8
3	Ongoing process for growth mindset	6
4	Focus strategies	2
5	Keeping oneself motivated	4
Total number of items		24
Total score		120

Instructions for the scale. The instructions of the scale are written in English. They are brief and easy to understand. They include information about the purpose of the scale, the way of recording the answers and the time allowed to complete the scale.

Piloting the scale. A pilot run was conducted with a mixed-gender group of 30 future EFL teachers enrolled in the basic-education section in Minia University's Faculty of Education during the second semester of the 2022-2023 academic year. The pilot scale determined an average completion time of 25 minutes, based on the total time taken by all participants divided by the number of participants (30).

Validity of the scale.

1. The face validity of the scale.

It was determined by submitting it to a panel of five TEFL experts who evaluated it based on three key criteria: clarity of language in the scale items, alignment with the environmental education-based program's learning objectives, and appropriateness for the target student population (30 future EFL teachers at the basic education section). The experts' feedback and recommendations were incorporated to refine the scale into its final form.

3. The internal consistency of the scale.

The same piloting sample took the scale. The internal consistency of each dimension was determined and the correlation between the five dimensions of the scale and the total scale was calculated as shown in table 6. The values of the correlation coefficients ranged from (0.784) to (0.875). It is significant at (0.01) level and considered acceptable.

Table 6

Establishing the internal consistency of the scale/ The Correlation Between Each dimension and the scale (N=30)

The Dimensions	Internal consistency
Self-efficacy and persistence	0.847
Mental strength	0.784
Ongoing process for growth mindset	0.864
Focus strategies	0.875
Keeping oneself motivated	0.831

Note. **Correlation is significant at the 0.01 level.

Reliability of the scale.

Establishing the reliability of the scale was done during piloting. The same piloting sample took the scale. The reliability coefficient of the scale was determined using:

1. **Alpha Cronbach (α) coefficient**. It ranged from (0.712) to (0.842) for each of the dimensions of the scale and for the total of the dimensions. The alpha coefficient of the whole scale is (.823). It is considered acceptable as shown in table 7.

Table 7

Establishing the reliability of the scale / The Cronbach Alpha's Reliability coefficient of the scale (N=30)

Dimensions	Means	Variance	No. of items	Alpha
Self-efficacy and persistence	15.53	1.844	4	0.712
Mental strength	32.77	14.392	8	0.805
Ongoing process for growth mindset	20.33	6.368	6	0.725
Focus strategies	5.43	1.220	2	0.741
Keeping oneself motivated	13.63	1.895	4	0.842
Total dimensions	87.70	41.597	24	0.823

Note. **Correlation is significant at the 0.01 level.

2. **The split-half method**. It ranged from (0.752) to (0.843) for each of the dimensions of the scale and for the total of the dimensions. The Guttman Split-half coefficient of the scale is (.872). It is considered acceptable as shown in table 8.
3. **The Spearman-Brown Coefficient**. It is 0.892. It is considered acceptable as shown in table 8.

Table 8)

Establishing the reliability of the scale / Split Half Reliability Coefficient of the scale

Dimensions	Correlation Between Forms	Spearman-Brown Coefficient	Guttman Split-Half Coefficient
Self-efficacy and persistence	0.752	0.845	0.862
Mental strength	0.812	0.856	0.897
Ongoing process for growth mindset	0.832	0.896	0.864
Focus strategies	0.843	0.842	0.873
Keeping oneself motivated	0.832	0.874	0.817
Total dimensions	0.883	0.892	0.872

Note. **Correlation is significant at the 0.01 level.

4. ***The Pearson correlation formula***. It was also used to determine the inter-rater reliability of the scale. Two raters with approximately the same academic level checked the participants' responses on the scale. The mean values received by the participants were calculated. The inter-rater reliability ranged from (0.742) to (0.838).

Cohen et al. (2007:506) point out that the split half coefficient and the alpha coefficient are considered reliable if they range from 0.70 to 0.90. Thus, both reliability coefficients of the scale are considered within the acceptable range.

Scale time Allocation. Time taken by each participant was recorded, divided by the whole number of the participants (30) who took the scale, which was found to be 45 minutes. Thus, the testing time was 45 minutes.

The environmental education-based program

The program of this study was designed by the researcher to equip future EFL teachers with the English language skills and positive outlook essential for a sustainable future. Addressing environmental issues, the program targets developing the participants' language green skills. This means developing their proficiency in discussing, analyzing and advocating for environmental cases. The program also targets fostering a

growth mindset through training in goal setting, learning from mistakes, celebrating progress, and approaching challenges as opportunities for learning and improvement. This development would be achieved within the context of both language and environmental awareness.

Its aim

The aim of this program is to empower future EFL teachers to become active participants in creating a more sustainable future. It cultivates two key aspects:

1- Developing language green skills: the participants will be equipped with a strong foundation of relevant vocabulary, honing their communication abilities, and critical thinking skills. This would enable them to discuss, analyze, and advocate strongly for environmental reform. Thus, they will be empowered to become environmentally conscious and active citizens.

2- **Nurturing a growth mindset:** the participants will be encouraged to adopt a positive outlook towards both their language learning and environmental issues. They will be trained to set achievable goals, learn from setbacks, celebrate success and consider obstacles as steppingstones for growth and improvement.

Its Structure

It is a ten-unit program which follows a four-step process to empower future EFL teachers' language green skills and a growth mindset. Each unit targets a specific environmental theme like home electricity or carbon footprint. Each unit first builds vocabulary, then develops comprehension through analyzing environmental-based texts. This knowledge is then transferred into effective communication skills for discussing, writing persuasively, and presenting environmental concerns. Finally, the program culminates in environmental advocacy projects, where teachers leverage their language skills to raise awareness and inspire action. Throughout these environmental challenges, teachers will encounter opportunities to develop both their language proficiency and environmental consciousness, fostering a growth mindset.

Its components (***The Green Routine)***

Its components

The program utilizes a well-structured, two-hour study session format to ensure a consistent and effective learning experience. By encompassing green touches into each unit, the researcher attempted to broaden future EFL teachers' perspectives to realize the important effect of green skills on all our future lives. Thus, the participants would develop a greener

mindset and preserve these ideas for more developed projects. The green routine would proceed as follows:

- An anticipatory set with a small chat about environmental news (e.g. home practices, climate news, healthy lifestyles, smart and wise shopping, etc.) to initiate participants' greener thinking.
- Glossary: Essential terms and concepts related to the session topic are clearly defined and explained.
- Green reflection as an integral part of every class. There always would be an environmental angle to be tackled (e.g. after reviewing transportation vocabulary, develop critical thinking about the way transportation affects other life aspects; food, waste, clothing, investments).
- Relevant videos or audios would be presented for bringing outdoors actions indoors to add variety, offer multisensory learning, and address different styles of learning. Thus, learning will be memorable and more attached to nature.
- Drawings and images will be incorporated to support creative thinking.
- Post reflection is integrated where reflection is combined with a touch of playful competition as a perfect way for celebrating your green choices (e.g. making green salad, successful trails to decrease electricity and natural gas bills, reforming behavior in water consumption, etc.)

Its activities

the program culminates in action-oriented activities where students use their English skills to advocate for and implement solutions to become more environmentally friendly. This includes learning about and practicing comparisons, listening and reading comprehension discussions, reporting opinions either orally or in writing all about environmental and sustainability issues. As future teachers, they are trained to prepare environmentally related materials like posters, brochures, drawings or bulletin board displays.

Different games are integrated in which teams work together to find as much information as possible in a short amount of time. These games can target vocabulary or reading comprehension (e.g. sorting showdown where cards with pictures or descriptions of objects are prepared for the participants to categorize as "reduce," "reuse," "recycle," or "compost" based on their understanding). They can also address problem-solving (e.g. eco-dilemma where hypothetical environmental scenarios are

presented to brainstorm solutions, considering economic and environmental factors). Other games target developing a growth mindset (e.g. **"I Used to Think..." journals where participants** reflect on their environmental knowledge and actions at the beginning of the program. At the end, they revisit their entries and write "Now I Think..." to showcase their growth).

Learning resources

This program employs reliable learning resources for enhancing green skills such as cases, stories, accident reports, extracts from books to enable learners to understand what is happening beyond the classroom. This happens alongside acquiring green knowledge from the existing technical texts.

Evaluation of the program

Formative Evaluation is implemented to refine the program during its implementation, ensuring it continues to meet participants' needs and interests in alignment with the program objectives. This includes:

- Ongoing observations for the participants' participation, engagement, and collaboration in activities.
- Exit tickets after each unit to answer quick reflection questions on what they learned and what they found challenging.
- Project rubrics for the materials that were created to assess participants' understanding of environmental concepts, problem-solving skills, and communication abilities.
- Self-reflection journals where participants reflect on their learning journey, highlighting improvements in their green vocabulary, environmental awareness, and a growth mindset.

Summative Evaluation is added to provide a final picture of participants' learning and the program's overall success in achieving its goals. This includes summative quizzes that were given at the end of each unit. These quizzes measured how well the participants learned the key concepts covered in that unit.

The Experimental Procedures

1. A test of sustainability concepts and a scale of a growth mindset were developed and conducted by the researcher to identify the knowledge gaps future EFL teachers have in green knowledge and their persistence. These exploratory instruments aimed to gather information that would help future EFL teachers actively participate in the intervention and strengthen their English green skills and a growth mindset.

2. ***Pre-testing procedures***

- Pre-testing the participants of both the treatment and non-treatment groups, (N=60), using the test of green knowledge before the intervention to ensure their homogeneity at the entry level. According to table 9, the average scores (means) and spread of scores (standard deviations) on the green knowledge test were close for both the treatment and non-treatment groups. This is statistically confirmed by a nonsignificant t-value, indicating no difference between the groups at the commonly used confidence levels of 95% (0.05) and 99.9% (0.001). This finding supports the homogeneity of the two groups in terms of their green knowledge before the intervention began.

Table 9

Means, standard deviation, mean difference, t-value, η2 and effect size on the pre-performance of the treatment and non-treatment groups of the test of Green Knowledge (N=60)

Aspect of comparison	Group	Mean	Std. Deviation	t-value	df	Sig. (2-tailed)
Test items 40	Pre- treatment	15.35	2.14	1.654	58	0.521
	Pre - non-treatment.	14.65	3.58			

Note. **. Significant at the 0.01 level (2-tailed)

Note. *. significant at the 0.05 level (2-tailed)

- Pre-testing the participants of both the treatment and non-treatment groups, (N=60), using the scale of eco-select navigator before the intervention to ensure their homogeneity at the entry level. According to table 10, the average scores (means) and spread of scores (standard deviations) on the scale of eco-select navigator were close for both the treatment and non-treatment groups. This is statistically confirmed by a nonsignificant t-value, indicating no difference between the groups at the commonly used confidence levels of 95% (0.05) and 99.9% (0.001). This finding supports the homogeneity of the two groups in terms of their environmental consciousness before the intervention began.

Table 10

Means, standard deviation, mean difference, t-value, η2 and effect size on the pre-performance of the treatment and non-treatment groups of the scale of eco-select navigator (N=60)

Total Items	Scale	Group	Mean	Std. Deviation	t-value	df	Sig. (2-tailed)
40		Pre- treatment	11.23	0.68	0.796	58	0.572
		Pre - non-treatment.	11.13	0.68			

Note. **. significant at the 0.01 level (2-tailed)
Note. *. significant at the 0.05 level (2-tailed)

- Pre-testing the participants of both the treatment and non-treatment groups, (N=60), using the scale of a growth mindset before the intervention to ensure their homogeneity at the entry level. According to table 11, the average values (means) and spread of values (standard deviations) on the scale of a growth mindset were close for both the treatment and non-treatment groups. This is statistically confirmed by a nonsignificant t-value, indicating no difference between the groups at the commonly used confidence levels of 95% (0.05) and 99.9% (0.001). This finding supports the homogeneity of the two groups in terms of their current mindset before the intervention began.

Table 11

Means, standard deviation, mean difference, t-value, η2 and effect size on the pre-performance of the treatment and non-treatment groups of the scale of a growth mindset (N=60)

Aspects of comparison	Group	Mean	Std. Deviation	t-value	df	Sig.
Self-efficacy& persistence	pre – treatment	5.37	1.03	0.234	58	0.815
	pre-non-treatment	5.43	1.17			
Mental strength	pre – treatment	12.97	1.10	0.647	58	0.520
	pre-non-treatment	13.17	1.29			
Ongoing process for growth mindset	pre – treatment	9.10	2.48	0.336	58	0.738
	pre-non-treatment	9.27	1.11			
Focus strategies	pre – treatment	3.43	0.82	1.594	58	0.116
	pre-non-treatment	3.13	0.63			
Keeping oneself motivated	pre – treatment	6.20	1.21	0.922	58	0.361
	pre-non-treatment	5.97	0.67			
Total of Dimensions	pre – treatment	37.07	3.26	0.135	58	0.893
	pre-non-treatment	36.97	2.40			

Note. **. significant at the 0.01 level (2-tailed)

3- **The intervention.** Participants at the treatment group were trained using the environmental education-based program passing through all the previously mentioned steps, activities, tasks, and evaluation procedures.
4- **Post-testing procedures**. Post-testing the participants of both the treatment and nontreatment groups, (N=60), using the test of green knowledge, the scale of eco-select navigator and the scale of a growth

mindset after the intervention to compare the results with the pre-testing results.

5- **The non-treatment group**. Participants in the non-treatment group received instruction on methodology course using the regular way with no environmental education-based program intervention.

Results and Discussion

Verifying study hypotheses

Hypothesis 1

The first hypothesis of the study predicted that there was a statistically significant difference (favoring the treatment group) between mean scores obtained by the participants of the treatment and the non-treatment groups on the post- performance on the test of green knowledge. Statistical analysis of the obtained data showed that the treatment group achieved a higher degree of improvement than the non-treatment group on this test as t-value (16.35) is significant at (0.01) level and beyond. Thus, the first hypothesis is confirmed. Table 12 below shows the data obtained to test this hypothesis.

Table 12

Statistical analysis of data obtained by the participants of the treatment and the non-treatment groups on the post- performance on the Test of Green Knowledge, (N=60)

Aspects of comparison	Group	Mean	Std. Deviation	t-value	df	Sig. (2-tailed)	η2	Effect size
Total Items	Non-treatment	27.73	3.72	**16.35	58	0.001	0.822	Large
	treatment	37.87	1.04					

Note. **. significant at the 0.01 level (2-tailed)

Note. *. significant at the 0.05 level (2-tailed)

To assess the effectiveness of the environmental education based-program in fostering future EFL teachers' green knowledge, statistical analysis utilizing the eta-squared formula (η2) was employed. Cohen et al. (2007:522) have indicated that an eta-squared value of 0.01 signifies a weak effect, 0.06 represents a medium effect, and 0.14 indicates a large effect. The results, presented in table 12 , revealed a remarkably large eta-squared value of 0.822. This falls well within the category of a large effect, suggesting the environmental education based- program has a substantial and large impact on improving future EFL teachers' green knowledge.

The large impact of the environmental education based- program was not limited to just comparing the treatment and non-treatment groups. Analyzing the treatment group's performance itself revealed a significant improvement in their green knowledge. Table 13 illustrates a substantial difference between their scores on the pre- and post-assessment test of green knowledge (t-value = 35.65, significant at 0.01 level and beyond). This statistically significant difference indicates a great improvement within the treatment group. Further strengthening this finding, the eta-squared value (η^2) for this comparison is exceptionally high at 0.956, which again falls under the category of a large effect. This reinforces the conclusion that the environmental education based- program has a powerful influence on equipping future EFL teachers with green knowledge within the treatment group.

Table 13

Comparison of pre- and post-test scores within the treatment group for the Test of Green Knowledge. (N=30)

Aspects of comparison	Group	Mean	Mean diff	Std. Deviation	t-value	df	Sig.	η2	Effect size
Total Test Items	Pre-treatment.	15.35	22.52	2.14	**35.65	29	0.000	0.956	Large
	Post-treatment.	37.87		1.04					

Note. **. significant at the 0.01 level (2-tailed)

Note. *. significant at the 0.05 level (2-tailed

Hypothesis 2

The second hypothesis of the study predicted that there was a statistically significant difference (favoring the treatment group) between mean values obtained by the participants of the treatment and the non-treatment groups on the post- performance on the scale of eco-select navigator. Statistical analysis of the obtained data showed that the treatment group achieved a higher degree of improvement than the non-treatment group on this scale as t-value (15.99) is significant at (0.01) level and beyond. Thus, the second hypothesis is confirmed. Table 14 below shows the data obtained to test this hypothesis.

Table 14

Statistical analysis of data obtained by the participants of the treatment and the non-treatment groups on the post- performance on the Scale of eco select -navigator, (N=60)

Aspects of comparison	Group	Mean	Std. Deviation	t-value	Df	Sig. (2-tailed)	η2	Effectsize
Total Items 10	Non-treatment	19.20	2.16	**15.99	58	0.001	0.892	Large
	Post – treatment	27.47	1.87					

Note. **. significant at the 0.01 level (2-tailed)
Note. *. significant at the 0.05 level (2-tailed)

To assess the effectiveness of the environmental education-based program in fostering future EFL teachers' environmental consciousness, statistical analysis utilizing the eta-squared formula (η2) was employed. The results, presented in table 14, revealed a remarkably large eta-squared value of 0.892. This falls well within the category of a large effect, suggesting that the environmental education-based program has a substantial and positive impact on improving green consciousness among future EFL teachers.

The large impact of the environmental education-based program was not limited to just comparing the treatment and non-treatment groups. Analyzing the treatment group's performance itself revealed a significant improvement in their green consciousness. Table 15 illustrates a substantial difference between their values on the pre- and post-assessment of green consciousness (t-value = 33.52, significant at 0.01 level and beyond). This statistically significant difference indicates a great improvement within the treatment group. Further strengthening of this finding, the eta-squared value (η^2) for this comparison is exceptionally high at 0.923, which again falls under the category of a large effect. This reinforces the conclusion that the environmental education based- program has a powerful influence on fostering green consciousness of future EFL teachers within the treatment group.

Table 15

Comparison of pre- and post-test scores within the treatment group for the Scale of Eco-Select Navigator. (N=30)

Aspects of comparison	Group	Mean	Mean diff	Std. Deviation	t-value	df	Sig.	η2	Effect size
Total Scale Items	Pre-treatment.	27.46	16.23	1.88	**33.52	29	0.000	0.923	Large
	Post-treatment.	11.23		0.67					

Note. **. significant at the 0.01 level (2-tailed)

Note. *. significant at the 0.05 level (2-tailed

Hypothesis 3

The third hypothesis of the study predicted that there was a statistically significant difference (favoring the treatment group) between mean values obtained by the participants of the treatment and the non-treatment groups on the post- performance on the scale of a growth mindset. Statistical analysis of the obtained data showed that the treatment group achieved a higher degree of improvement than the non-treatment group on this scale as t-value (14.544) is significant at (0.01) level and beyond. Thus, the third hypothesis is confirmed. Table 16 below shows the data obtained to test this hypothesis.

Table 16

Statistical analysis of data obtained by the participants of the treatment and the non-treatment groups on the post- performance on the scale of a growth mindset *(N=60)*

Aspects of comparison	Group	Mean	Std. Deviation	t-value	Df	Sig.	η2	Effect Size
Self-efficacy and persistence	Post – treatment	16.93	1.57	10.465	58	0.001	0.654	Large
	Post-non-treatment	13.03	1.30					
Mental strength	Post – treatment	34.83	1.70	8.391	58	0.001	0.549	Large
	Post-non-treatment	30.47	2.29					
Ongoing process for growth mindset	Post – treatment	25.60	1.57	10.181	58	0.001	0.642	Large
	Post-non-treatment	20.00	2.57					
Focus strategies	Post – treatment	8.33	.80	12.854	58	0.001	0.741	Large
	Post-non-treatment	4.50	1.53					
Keeping oneself motivated	Post – treatment	15.97	1.90	8.089	58	0.001	0.531	Large
	Post-non-treatment	11.83	2.05					
Total of Dimensions	Post – treatment	138.73	6.05	14.544	58	0.001	0.785	Large
	Post-non-treatment	116.80	5.63					

Note. **. significant at the 0.01 level (2-tailed)

Note. *. significant at the 0.05 level (2-tailed)

To assess the effectiveness of the environmental education-based program in fostering future EFL teachers' growth mindset, statistical analysis utilizing the eta-squared formula (η2) was employed. The results, presented in table (16), revealed a remarkably large eta-squared value of 0.785. This falls well within the category of a large effect, suggesting the environmental education-based program has a substantial and positive impact on improving a growth mindset among future EFL teachers.

The large impact of the environmental education-based program was not limited to just comparing the treatment and non-treatment groups. Analyzing the treatment group's performance itself revealed a significant improvement in their concept of the growth mindset. Table 17 illustrates a substantial difference between their values on the pre- and post-assessment of their concept of a growth mindset (t-value = 143.83, significant at 0.01 level and beyond). This statistically significant difference indicates a great improvement within the treatment group. Further strengthening of this finding, the eta-squared value (η^2) for this comparison is exceptionally large at 0.999, which again falls under the category of a large effect. This reinforces the conclusion that the environmental education-based program has a powerful influence on fostering future EFL teachers' concept of a growth mindset within the treatment group.

Table 17

Comparison of pre- and post-test values within the treatment group for the scale of a growth mindset*. (N=30)*

Aspects of comparison	Group	Mean	Std. Deviation	t-value	Df	Sig.	η2	Effect size
Self-efficacy and persistence	Pre- treatment.	5.37	1.03	-42.86	29	0.001	0.985	Large
	Post- treatment.	16.93	1.57					
Mental strength	Pre- treatment.	12.97	1.10	-62.22	29	0.001	0.993	Large
	Post- treatment.	34.83	1.70					
Ongoing process for growth mindset	Pre- treatment.	9.10	2.48	-28.22	29	0.001	0.965	Large
	Post- treatment.	25.60	1.57					
Focus strategies	Pre- treatment.	3.43	0.82	-29.08	29	0.001	0.967	Large
	Post- treatment.	8.33	0.80					
Keeping oneself motivated	Pre- treatment.	6.20	1.21	-25.13	29	0.001	0.957	Large
	Post- treatment.	15.97	1.90					
Total of Dimensions	Pre- treatment.	37.07	3.26	-143.83	29	0.001	0.999	Large
	Post- treatment.	138.73	6.05					

Note. **. significant at the 0.01 level (2-tailed)

Note. *. significant at the 0.05 level (2-tailed)

Discussion

The following discussion will compare the present study outcomes with what other literature has found, illuminating consistencies, and disparities, and outlining the broader implications of the present study.

The study's design forms the basis for interpreting the findings.

The design of the environmental education- based program presents a special integration of English language skills and global issues. This integration fosters a positive ripple effect, promoting eco-friendly learning, fostering sustainability practices, and developing environmental consciousness. All of this coincides with enhancing their pursuit for learning and viewing obstacles and setbacks as opportunities for more growth. This program's unique characteristics likely stem from a combination of the researcher's pre-defined research questions, the chosen framework for environmental education, and the innovative nature of the program itself.

Post-intervention reflections and observations of participants' reactions provided valuable insights.

After participating in the intervention, participants shared valuable reflections and observations. These centered on several key areas:

- Developing language green skills. Several participants initially struggled with being familiar with environmental vocabulary and ideas. However, after brainstorming techniques, using games, and sharing different resources, participants' reflections showed increased confidence in their ability to analyze, discuss, argue for and against different environmental issues.
- Fostering a growth mindset. Most of the participants felt discouraged at the beginning by the unfamiliar environmental concepts introduced. Some of them even reported their lack of environmental awareness concerning some issues. However, this challenge was addressed by enhancing a growth mindset. Through discussions, case studies and the training participants received on embracing mistakes, they were encouraged to view setbacks as chances for learning and growth. This shift in perspective proved to be a powerful support system for the participants.
- Beyond the improvement of their green skills, the participants assured the knowledge and awareness they gained in environmental advocacy in their lives.

The interpretation of the findings with reference to the related literature

The current absence of scientific articles on enhancing students' green mindset in the process of learning English indicates the necessity to develop transitional environmental content as additions to training modules. Moreover, there is a high need to integrate green skills in both extra-curricular and co-curricular activities. Promoting environmental consciousness among all educators should be considered. These findings align with previous research by Kudryavtseva, Barsuk and Frolova (2022) who emphasized the need for educating all learners to become knowledgeable, competent, environmentally conscious and active participants leading a healthy lifestyle.

Moreover, the present study emphasized the importance of developing a growth mindset besides the enhancement of an environmental consciousness in educational contexts. Maintaining a growth mindset should enable young people to face the challenges in life they are yet to face, opens opportunities for them, and keeps them motivated in their learning processes. Through a strong growth mindset, learners and all people alike can maintain autonomy, resilience, motivation, and enthusiasm in facing all life challenges. This is backed up by research conducted by He et al. (2023), Lee et al. (2023), Reyes (2023), Viña et al. (2022) and Whyte (2016) emphasizing the idea persons with a growth mindset value problems, the time and effort they put into continuously improving their situations.

While this study found success in fostering green skills and a growth mindset among future EFL teachers, it's important to acknowledge differing results in previous research. Ramli et al. (2019) suggested that traditional environmental education curriculum content alone may not be enough to achieve significant learning outcomes. They pointed out that many people globally still lack awareness of the crucial link between environmental management and improving quality of life.

Similarly, some past studies on the growth mindset did not show a clear positive connection between a growth mindset and desired outcomes. For instance, Reyes (2023), Rammstedt et al. (2022), and Yu et al. (2022) did not find consistent evidence for a growth mindset directly influencing positive goal regulation, academic achievement, or impacting the learning improvement of others.

Challenges

- Finding relevant engaging materials, games, and activities or adapting existing materials for the program was challenging. This was overcome through using vocabulary lists, work sheets, and activity templates.
- Keeping all the participants motivated and engaged throughout the program was difficult. However, by incorporating a variety of games, and simple projects, learning was kept dynamic and suitable for different learning styles.
- Approaching participants with varying levels of English language proficiency or prior environmental knowledge was a challenge. However, offering activities with varying difficulty levels or providing different representation choices within activities to cater to their English proficiency and environmental knowledge was a successful solution.

Limitations

- The researcher only used quantitative research methods to gather the data. As such, future researchers are encouraged to replicate similar studies by employing qualitative methods to triangulate their quantitative findings and shed more light on the interconnections among these constructs' growth mindset, and work engagement.
- The sample recruited in this study was not a big sample, thereby limiting the generalizability of the findings. Therefore, future researchers are encouraged to conduct the study with a larger and more diverse sample population.

Conclusions

Green skills directly transfer into environmentally responsible actions which in turn reflect environmental awareness and commitment to sustainability. Discussions about the significance of green habits become springboards for authentic communication. Thus, all undergraduate programs in public universities should integrate these fundamental green competencies into their curriculum. Similarly, a growth mindset appears to be a key element in teacher well-being and student success. Teachers with a growth mindset are more adaptable, flexible, engaged, and satisfied in their work, likely due to increased motivation and resilience. Self-reflection, grit, perseverance through challenges can be advantageous for teachers in navigating everyday classroom situations. Interestingly, teacher practices and school environments can influence

student mindsets, with methods like guided inquiry and a focus on social-emotional development fostering a growth mindset in students. Overall, these findings suggest that cultivating a growth mindset through an environmental approach in both teachers and students can create a more positive and productive learning experience. Thus, academicians should aim at developing green skills and a growth mindset among the students, so they can be resilient in facing challenges either in school or in real life.

Implications

A successful implementation of the program has the potential to create a positive ripple effect through:

- Empowering the participants with valuable knowledge and skills in environmental education, English language proficiency, and critical thinking. They develop a growth mindset, fostering confidence in tackling environmental challenges.
- Inspiring a generation of environmentally conscious young people who could make informed decisions and act towards a sustainable future.
- Offering a model for integrating environmental education, language learning, and growth mindset development.

Recommendations

- There is a high need for adequate learning resources (cases for analysis, job-oriented projects for students), authentic documentation, and interdisciplinary cooperation in developing green skills at their courses.
- Curriculum designers should be keen to design “greening” course syllabus, develop learning resources and apply active learning approaches to promote green skills honing and meet the requirements of different industries.
- Educators should consider recognizing students' efforts and the actions they take to get over challenges and progress to support the important idea that ability can be developed.
- Educators are highly recommended to motivate, give constructive criticism, and offer more challenging tasks for students to exert more effort as a step towards developing a growth mindset.
- Educators should provide feedback that emphasizes the benefits of organizing and experimenting with various learning strategies.

- Educators should encourage students to elaborate on their ideas and comments, help them better understand the material, and make sure they realize the importance of trying and exercising critical thought.
- Partnerships between educational institutions and environmental organizations or local experts should be established to enrich the educational programs with guest speakers or field trips.
- Technology integration should be explored using educational games, apps, or simulations to create a more interactive learning experience.

Suggestions for Further Research

- Investigate the relationship between the academic achievement of college students and their growth mindset.
- A follow-up study with the same program participants 1-2 years later. This could involve surveys, interviews, or observations to assess whether the program had a lasting impact on their environmental behaviors and decision-making.
- Evaluate the effectiveness of specific program elements, such as the use of games, real-world projects, or growth mindset activities. This could help identify which elements are most successful in promoting environmental learning and a growth mindset.
- A more comprehensive Eco-Select Navigator scale that can be used in future studies to measure environmental consciousness across different age groups and cultural contexts.
- Further research on the link between a growth mindset and students' engagement in environmental action. This could involve exploring the way the program can be further optimized to nurture a growth mindset that translates into real-world environmental initiatives.
- Explore the potential of integrating educational technology tools and applications to enhance the program's reach and engagement. This could involve developing interactive simulations, online games, or mobile apps that complement the classroom activities.
- Investigate ways to expand the program's impact beyond the classroom by involving parents, community members, and local environmental organizations. This could include workshops, community clean-up events, or guest speaker sessions.

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Online Resources

- https://renewableenglish.com/a-greener-coursebook
- Outdoor Learning Made Easy
- ELT Footprint