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Exploring ecocentrism and anthropocentrism beliefs of Gen Z: An Indonesian context

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ABSTRACT

This study delved into ecological awareness among Generation Z using the New Ecological Paradigm (NEP) scale to discern ecocentric and anthropocentric environmental beliefs. The data was collected from 545 students across state and private universities with categorization based on gender, age group, year level, study program and area of residence employing a quantitative research approach. A five-point Likert-type NEP scale comprising 15 items was administered through Google Forms ensuring representation from each study program. Statistical analysis conducted using SPSS for Windows 23.0 employed independent sample T-tests to evaluate differences in Gen Z's ecological awareness. The results revealed significant disparities in Gen Z's awareness across dimensions including reality, growth limits, anti-anthropocentrism, the fragility of nature's balance and the possibility of an eco-crisis with variations observed based on study programs. Furthermore, age groups influenced awareness of the limits of growth and the possibility of an eco-crisis while gender played a role in awareness of the problem of the limits of growth. Gen Z's ecological orientations depicted differences in ecocentric beliefs by year level and anthropocentric values varied based on area of residence. These findings offer valuable insights into students' alignment with ecological principles and environmental awareness. This research contributes to the broader discourse on sustainable practices and environmental education by enhancing our understanding of how individuals particularly university students, perceive and respond to ecological and environmental challenges.

Contribution/Originality: This study lies in its focus on Generation Z within the Indonesian context, its nuanced exploration of ecocentric and anthropocentrism beliefs, its methodological rigor and its practical implications. The study lays the groundwork for environmental interventions and policies that resonate with the values and concerns of this pivotal demographic group.

1. INTRODUCTION

The New Ecological Paradigm (NEP) scale is widely used for gauging individual perspectives on the environment and the relationship between humanity and nature (Dunlap, Van Liere, Mertig, & Jones, 2000). It evaluates individuals' beliefs and attitudes towards nature, the environment and the imperative of ecological sustainability. The NEP scale comprises statements about environmental issues with respondents expressing agreement or disagreement with these statements (Dunlap, 2008; López-Bonilla & López-Bonilla, 2016). The scale provides insights into the presence of a more ecocentric worldview by measuring the extent to which individuals

endorse pro-environmental beliefs and attitudes. Furthermore, it aids in identifying variations in environmental attitudes across different demographic groups, including distinct age cohorts like Generation Z.

In recent times, there has been a growing imperative to investigate the readiness of the current young generation to face the complexities and possibilities associated with global environmental development. The younger population has to anticipate significant consequences considering ecological issues' escalating scale and intensity. Generation Z (Gen-Z) born in the mid-1990s and maturing in the 2000s has received comparatively less attention. Gen-Z, often known as "Post-Millennials" (Seemiller & Grace, 2016) has grown up in the digital age and has easy access to social media and digital platforms (Singh & Dangmei, 2016). Despite differing opinions on the categorization of this generation (Priporas, Stylos, & Fotiadis, 2017), the undeniable reality is that Gen-Z is currently entering high school and university as young adults (Nguyen, Lobo, & Greenland, 2017). Consequently, it becomes imperative for them to possess ecological knowledge, skills and competencies to effectively address environmental issues and forthcoming challenges (Arrobas, Ferreira, Brito-Henriques, & Fernandes, 2020). Previous research has only marginally delved into the connection between awareness and pro-environmental behavior within specific demographic groups (Dabija, Bejan, & Dinu, 2019; Noor, Jumain, Yusof, Ahmat, & Kamaruzaman, 2017). The significance of understanding awareness and environmentally conscious behavior in Generation Z commonly referred to as digital natives is underscored by their substantial representation in the global population, accounting for approximately 32% (Sakdiyakorn, Golubovskaya, & Solnet, 2021). Gen-Z has developed a distinct perspective on their environment from an early age growing with the rapid advancements of digital platforms. What sets this generation apart from its predecessors is a heightened inclination to opt for eco-friendly products and an inherent motivation to engage in environmentally friendly practices (Adnan, Ahmad, & Khan, 2017).

According to Zilahy and Huisingh (2009) education is crucial in fostering environmental awareness. Classroom exposure to sustainable environmental topics significantly influences students' awareness and pro-environmental behavior (Pizmony-Levy & Ostrow, 2018). Factors such as the type of course, lecture duration, age and gender can contribute to variations in environmental consciousness. Pizmony-Levy and Ostrow (2018) found that students enrolled in applied courses tend to exhibit lower engagement in environmental activities. Conversely, those pursuing majors in business, education, psychology and sociology are more inclined to participate in protests and demonstrations related to environmental issues.

Additionally, extended academic involvement and study duration have been associated with heightened levels of personal environmental behavior (Pizmony-Levy & Ostrow, 2018). Cotton and Alcock (2013) established a connection between experiences in higher education and a commitment to environmental sustainability noting a more pronounced pro-environmental attitude among women than men. This finding is consistent with other research suggesting that women play a significant role in pro-environmental behavior especially within the private sphere (Yates, Lou, Mobley, & Shealy, 2015).

According to Dunlap and Van Liere (1978) there has been a significant focus on raising environmental awareness particularly marked by the introduction of the New Environmental Paradigm (NEP) scale as an alternative to the emerging Dominant Social Paradigm (DSP) worldview since 1970. The 12 items in the NEP scale are organised into three dimensions: natural balance, growth constraints and human dominance over nature (Dunlap, 2008; López-Bonilla & López-Bonilla, 2016). In a subsequent development, Dunlap et al. (2000) revised the NEP scale redesigning it as the New Ecological Paradigm (NEP-R) and incorporating three additional statement items in response to various criticisms. The revamped NEP-R aims to address limitations identified in the original scale with the extra items focusing on ecological considerations, assessing respondents' perceptions of the extent to which modern industrial societies operate within ecological constraints. Additionally, Dunlap (2008) introduced new elements to account for the increasing recognition of global environmental issues and concerns about climate change. These 15 items encompass eight pro-NEP items and seven anti-NEP items ensuring a balanced assessment

of the measured aspects. The NEP-R items are designed to measure fundamental attitudes and one-dimensional environmental beliefs providing a means to evaluate overall human-environment interactions (Dunlap et al., 2000).

Research on environmental concerns using the New Ecological Paradigm (NEP) in its original and revised forms has been extensively conducted worldwide particularly in Western nations. Some scholars have used the NEP scale through cross-sectional analysis (Johnson, Bowker, & Cordell, 2004; Poortinga, Steg, & Vlek, 2004) while others have undertaken cross-country or cultural comparisons of the NEP (Bechtel, Corral-Verdugo, Asai, & Riesle, 2006; Leung & Rice, 2002) and also explored its relationship with gender (Putrawan, 2019; Sharmin, Sultan, Badulescu, Bac, & Li, 2020). The application of the NEP in research is relatively limited in Southeast Asia particularly concerning environmental awareness within Generation Z despite this broad exploration (Loverio, Shen, & Chen, 2022).

In the context of Indonesia, the population census conducted by the Badan Pusat Statistik Central Statistics Agency (2021) revealed that Gen-Z amounts to 74.9 million or 27.9% of the population. Gen-Z is currently estimated to be between 10 and 25 years old. All of Gen-Z will enter the productive age group in the next seven years. The next largest age group is millennials (26-42 years old) with 69.3 million or 25.9% followed by Generation X (43-57 years old) with 58.7 million or 21.9%. This study limits its sample to individuals aged between 18 and 25 or currently enrolled as university students to address the following research questions considering the increasing number of Gen-Z individuals and the shifting trend towards environmentally friendly behavior in Indonesia:

Q1: Are there differences in ecological awareness among Gen Z according to their socio-demographic characteristics?

Q2: Are there differences in the worldview of Gen Z towards environmental issues in the NEP constructs based on their demographic characteristics?

Q3: Are there differences in Gen Z's ecocentric and anthropocentric environmental beliefs based on their social demographic characteristics?

The primary purpose of this research is (1) to explore whether there are differences in ecological awareness among Gen Z.

 (2) To identify whether there are differences in the worldview among Gen Z towards environmental issues in the NEP constructs.

(3)To identify whether there are differences in Gen Z's ecocentric and anthropocentric environmental beliefs based on their social demographic characteristics.

2. SIGNIFICANCE OF THE STUDY

Studying the ecocentrism and anthropocentrism beliefs of Gen Z is crucial for understanding this generation's values, behaviors and potential contributions to environmental sustainability. It provides a foundation for informed decision-making across various sectors, ultimately influencing the trajectory of global environmental stewardship.

3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

3.1. Applying the New Ecological Paradigm (NEP) Scale

The New Ecological Paradigm (NEP) is a widely used scale for evaluating environmental awareness and perspectives. Revisions to the New Environmental Paradigm (NEP) provide a distinct perspective on how humans and the environment interact (Dunlap et al., 2000). Originating in 1978 and developed by Riley Dunlap and Kent Van Liere, the NEP serves as a tool to measure individuals' ecological attitudes and beliefs. People express their agreement or disagreement, reflecting dimensions of environmental concern such as views on economic growth limits, the importance of environmental preservation and human involvement in shaping the natural world through a series of statements. Higher NEP scores signify a more substantial alignment with the new ecological paradigm

indicating a more ecocentric worldview (Hunter & Rinner, 2004). Dunlap et al. (2000) modified expressions within the items to eliminate outdated and discriminatory language while revising the original new environmental paradigm. They equalized the number of pro and anti-NEP statements and introduced the concept of "faset" to enhance the scale's validity. The New Ecological Paradigm (NEP-R) incorporates two additional dimensions: "human exceptionalism" and "the possibility of an eco-crisis" addressing the climate change phenomenon.

According to Dunlap et al. (2000) the NEP-R assesses community environmental values, ecological attitudes, beliefs and values. Higher NEP scores are associated with pro-environmental values or ecocentric worldviews where the environment holds intrinsic value independent of human needs and humans are seen as an integral part of nature (Hunter & Rinner, 2004). Conversely, lower NEP scores are linked with anthropocentrism. According to Gerhard (2004) individuals with high anthropocentric scores may express skepticism about the likelihood of an ecological crisis. However, Gangaas, Kaltenborn, and Andreassen (2015) caution against treating these concepts as strict dichotomies emphasizing that they exist on a gradient rather than being mutually exclusive. The NEP-R has been widely used in previous studies due to its strong theoretical foundation and excellent psychometric qualities as emphasized by Amburgey and Thoman (2012) and Dunlap et al. (2000). Its applicability has also been confirmed across various cultures and continents as demonstrated in research by De Groot and Steg (2008), Dunlap (2008), Gangaas et al. (2015), Ntanos, Arabatzis and Tsiantikoudis (2017) and Ntanos, Kyriakopoulos, Skordoulis, Chalikias and Arabatzis (2019).

Previous investigations have employed the NEP-R scale to examine the relationship between respondents' sociodemographic characteristics and ecological orientation. Studies by Banga and Rajni (2016), Kiely, Parajuly, Green, and Fitzpatrick (2021), Özgür, Varoğlu, and Yılmaz (2018), Rashid (2018) and Sousa, Quintino, Palhas, Rodrigues and Teixeira (2016) consistently reveal a prevalence of pro-ecological beliefs across all NEP scales. However, this inclination is more pronounced in items related to the fragility of the balance of nature and less prominent in items assessing the limits of growth as emphasized by Dunlap et al. (2000). For example, the study conducted by Kiely et al. (2021) expressed confidence in the potential occurrence of an environmental crisis and endorsed the idea of natural balance which aligns with this trend. However, this study shows "mixed support" for perspectives that reject exceptionalism and growth constraints. Potential explanations for this variation include students' optimism regarding the capability of science and technology to address these challenges. Similar findings have been observed by other researchers such as Sousa et al. (2016) indicating a widespread belief in human ability to exploit natural resources and resolve environmental issues.

Issues and environmental concerns stemming from population growth, economic expansion, industrialization, pollution, resource depletion and urbanization have become increasingly prevalent (Loverio et al., 2022). The root cause of these challenges can be attributed to human lifestyle and extensive interaction with the natural world (Barr & Gilg, 2006). Consequently, maintaining a delicate equilibrium between the natural environment and human activities is paramount. It becomes possible to cultivate responsible environmental behavior that can effectively mitigate and sustainably prevent environmental challenges by emphasizing the role of education in fostering an ecologically literate society (Huan, Li, & Liang, 2019). Therefore, higher education institutions have been urged to promote an increase in awareness of environmental sustainability (Harraway, Broughton-Ansin, Deaker, Jowett, & Shephard, 2012).

Generation Z possesses greater open-mindedness and cultural awareness than older generations, primarily attributed to their status as digital natives with a constant online presence when they enter university (Van den Bergh & Pallini, 2018). This generation is notably engaged in diverse forms of activism. It maintains a continuous online presence, actively participating in activities such as sharing, co-creating, reading, checking, comparing, analyzing and evaluating information and ideas to enhance their daily experiences (Dimitriou & AbouElgheit, 2019). Generation Z is deeply ingrained in the digital realm. However, studies on this generation concerning ecological awareness, especially in developing countries are relatively limited.

3.2. Generation Z and Ecological Awareness

Limited studies still assess the relationship between the anthropocentrism and ecocentric values inherent in the NEP scale and environmental awareness among Generation Z. Studies on anthropocentrism and ecocentric values have been widely documented (Alagoz & Akman, 2016; Berning, North, Stevens, & Clarke, 2023; De Lucia, 2017; Droz, 2022; Rülke, Rieckmann, Nzau, & Teucher, 2020). Theorists still debate the relationship between anthropocentrism and ecocentric values and environmentally friendly behavior. For example, Droz (2022) argues that anthropocentrism is often claimed as a scapegoat for the environmental crisis. At the same time, Rülke et al. (2020) view the need for an intermediary bridge between anthropocentrism and ecocentrism concerning environmentally friendly orientation. Berning et al. (2023) attempt to deconstruct the anthropocentrism versus ecocentrism binary through Māori oral traditions.

Akgül, Birinci, Göral, and Karaküçük (2017) studied ecocentric, anthropocentric and antipathetic attitudes toward the environment with different variables. Alagoz and Akman (2016) examined whether prospective teachers adhered to the anthropocentric or ecocentric paradigms in their perspective on environmental problems. However, these studies could be more comprehensive in applying the new ecological paradigm scale to assess anthropocentrism and ecocentrism perspectives.

Singh and Dangmei (2016) observed that members of Generation Z exhibit a significant interest in environmental issues and an increased sense of accountability regarding preserving natural resources. According to Vorontsova-Wenger, Ghisletta, Ababkov, and Barisnikov (2021) sociologists note that this generation places a high priority on the desire for public change and tends to exhibit rational consumption habits, cultural and natural sensitivity support for vulnerable groups and a willingness to embrace new rules and ethics. According to Seemiller and Grace (2016) Generation Z demonstrates a mindset marked by a keen interest in initiatives fostering social change showcasing more active participation in global events than the preceding generation. However, research by Parzonko, Balińska, and Sieczko (2021) suggests that despite this inclination, Generation Z is reported to be less involved in pro-environmental behavior than older age groups. Consequently, proactive efforts are essential in working with young individuals, introducing environmentally friendly practices and increasing public awareness about environmental issues. These efforts are crucial because Generation Z may only naturally prioritize these issues with targeted interventions despite their overall concern for environmental problems (Loverio et al., 2022).

The NEP scale stands out as a widely used tool for assessing the ecological worldview of students. This scale has been employed in various studies to gauge changes in students' ecological perspectives originally developed and validated in Western countries (Grúňová, Sané, Cincera, Kroufek, & Hejcmanová, 2019). For instance, Harraway et al. (2012) used the NEP to track shifts in students' ecological worldviews, addressing the imperative in higher education to understand the simultaneous influence of students' experiences and impacts on sustainability. Their research emphasized the significance of the NEP as a crucial research instrument and underscored the importance of assessing student attitudes before delving into discussions about institutional environmental issues. Similarly, Wells and Petherick (2016) used the NEP scale to explore sustainability in a multicultural educational setting in China. Their initial findings indicated that students resonated with the Western worldview concerning the reality of growth limits and anti-anthropocentrism but divergent perspectives emerged regarding the fragility of nature's balance.

Several prior studies have investigated the correlation between social demographic characteristics and ecological awareness among students yielding varying results. Alagoz and Akman (2016) and Kopnina and Cocis (2017) reported no impact of gender and choice of courses on students' anthropocentric or ecocentric approaches to environmental issues aligning with similar findings by Rashid (2018) and Özgür et al. (2018) that found no significant gender-based differences in environmental awareness. Similarly, Banga and Rajni (2016) observed no significant variations in environmental awareness among science and art students based on their study program.

However, Loverio et al. (2022) diverged from these results indicating that students' subject and major, gender and year level significantly influenced their responses to several NEP statements predominantly those associated with an anthropocentric viewpoint.

Previous research has also explored the link between the area of residence and environmental awareness among students. Grúňová et al. (2019) and Rashid (2018) identified significant differences in environmental awareness between rural and urban students reporting higher awareness among urban students. Conversely, Kaltenborn and Bjerke (2002) found a positive relationship between an anthropocentric view and an agricultural or rural environment. This finding aligns with Rachmatullah, Lee, and Ha's (2020) findings on preservice science teachers in Indonesia where individuals from agricultural-based rural communities exhibited a more anthropocentric perspective. In rural areas, Grúňová et al. (2019) highlighted that respondent displayed pro-ecocentric and anthropocentric attitudes. This result was consistent with Atav, Altunoğlu, and Sönmez's (2015) work indicating that students' attitudes tended to lean closer to an ecocentric perspective than an anthropocentric one.

Cross-national investigations have employed the NEP in their research endeavors. For example, Rachmatullah et al. (2020) conducted a study comparing potential science teachers in Indonesia with individuals in Korea focusing on their ecocentric values. The results indicated that participants from Indonesia scored higher than their Korean counterparts suggesting that Indonesians tend to hold more anthropocentric attitudes towards the environment. This inclination is associated with the economic dependence of Indonesia on its natural resources, particularly evident in the agricultural sector where many farmers experience poverty. As a result, their ecological values may lean towards a more self-centered perspective (Rachmatullah et al., 2020). Harraway et al. (2012) also delved into the influence of student majors on their NEP scores. Their study revealed that students with business majors consistently exhibited lower NEP scores compared to their counterparts, irrespective of political and gender orientations.

According to Xiao and Buhrmann (2017) the NEP scale served as the basis for examining the coherence of Ecological Concern (EC). The study found that NEP is a strong predictor of EC with students who engage in longer-duration studies demonstrating higher levels of personal environmental behavior (Pizmony-Levy & Ostrow, 2018). Benckendorff, Moscardo, and Murphy (2012) identified a significant gender effect particularly in anthropocentric factors exploring demographic characteristics and their impact on environmental worldview using the NEP scale. Most studies suggest that women exhibit a more pro-environment attitude than men (Casey & Scott, 2006). However, a study by Levine and Strube (2012) found that male students are more knowledgeable than females.

Previous research has explored the relationship between gender and environmental issues. Van Liere and Dunlap (1981) noted inconsistencies in their findings regarding this connection. For instance, Arcury and Christianson (1990) found that men tend to show greater environmental concern than women contrasting with research by Stern, Dietz, and Kalof (1993) and Stern, Kalof, Dietz, and Guagnano (1995). These later studies suggest that women exhibit stronger intentions for participating in pro-environmental actions and hold more robust beliefs about the negative consequences of environmental degradation. Stern et al. (1995) contend that variations in values between genders contribute to disparities in pro-environmental behaviors and intentions.

Previous studies prove that younger people care more about environmental damage than older people. For example, Van Liere and Dunlap (1981) noted that younger people are more likely to support actions against ecological damage than older people proving that four of the six scales negatively correlate with age. Similarly, Arcury and Christianson (1990) prove this age hypothesis using a modified NEP scale to investigate the rejection of critical environmental experiences (drought) to ecological problems. In their cross-sectional research, Howell and Laska (1992) found that young people showed more concern for environmental damage than older people. In addition, technological advances have strengthened the assumption that age impacts ecological awareness. For example, research by Nord, Luloff, and Bridger (1998) has shown a strong relationship between age and

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environmental care. Thus, the authors assume that there is a difference in ecological awareness between young groups and older groups.

The urban population cares more about the environment than the rural population. Studies by Arcury and Christianson (1990) also support the hypothesis of the area of residents. Those who live in the metropolitan region are significantly more concerned with the environment than those who live in provincial or rural cities. Howell and Laska (1992) supported this hypothesis which found that settlement areas became increasingly important in the 1980s as predictors of positive attitudes towards environmental protection.

Samdahl and Robertson (1989) stated that the relationship between sociodemographic factors and concern for environmental issues is generally weak. There is a tendency for advances in information technology to have increased ecological awareness (Baldassare & Katz, 1992; Howell & Laska, 1992). This increased awareness also weakens the relationship between sociodemographic factors and pro-environmental behavior. Gen-Z has been engaged in the digital sphere since a young age. They have developed an understanding and awareness of environmental issues through digital platforms.

Therefore, we connect the results of reviews of previous studies to the general assumptions of our research that there is no difference in student ecological awareness based on students' sociodemographic variables. We formulate the research hypothesis specifically as follows:

H₁: There is no difference in students' ecological awareness according to gender, study program, stream, age group, year level and area of residence.

H₂: There is no difference in students' attitudes towards the NEP construct according to gender, study program, stream, age group, year level and area of residence.

H₃: There is no difference in students' environmental orientation (ecocentrism and anthropocentrism) according to gender, study program, stream, age group, year level and area of residence.

4. METHODS

4.1. Research Design

This research employed a quantitative approach to investigate potential distinctions in the ecological awareness of Generation Z. The study used a questionnaire as its research tool with the New Ecological Paradigm (NEP) scale forming the foundation. Data collection involved distributing the questionnaire to participants who then expressed their level of agreement on a Likert 5-point scale. This questionnaire served as the primary instrument for achieving the study's objectives.

4.2. Research Participants

This survey research population comprises students from state and private universities in Bengkulu Province, Indonesia. Table 1 illustrates the proportion of respondents based on sociodemographic characteristics, namely gender, age, field of study, residential area and involvement in student organizations. The data collection method is a questionnaire that operates on the New Ecological Paradigm (NEP) variable. Data collection used the Google Form facility involving five postgraduate students as enumerators and data collection control from November 2022 to March 2023. The responses were 572 but 545 questionnaires were relevant to the research objectives and population segments.

Respondents comprised 40.7% of males and the remaining were females with 40.9% at the 1st-2nd level and the rest (59.1%) at the 3rd-up levels based on the demographic characteristics (see Table 1). In terms of age, most respondents (55.4%) were 18-21 and the remaining (44.6%) were 22-25. In terms of scientific background, research participants comprised the Social Sciences and Humanities Sciences groups (53.0%) and applied science (47.0%). Finally, most respondents (60.0%) reside in rural areas and the rest (40.0%) live in urban areas.

Table 1. Characteristics of respondents (n: 545).

Characteristics	Category	Frequency	Percentage (%)
Gender	1. Male	222	40.7
	2. Female	323	59.3
Year level	1. 1st-2nd	223	40.9
	2. 3rd-up	322	59.1
Field of studies	1. Applied Sciences[a]	256	47.0
	2. Social sciences and humantities[b]	289	53.0
Age of participants	1. 18-21 years old	302	55.4
	2. 22-25 years old	243	44.6
Area of student residence	1. Rural	327	60.0
	2. Urban	218	40.0

Note: [a] including medical and nursing departments, agriculture, engineering, life sciences, marine science and fisheries.
[b] including sociology, communication, public policy, social welfare, libraries and information systems, economics, law, teacher training and education.

4.3. Measurements and Analysis

The research participants were divided into two main groups based on gender for data analysis. For data analysis needs, research participants comprised two major groups based on gender (male and female), age (1st-2nd year and third year-up), field of study (applied field of study and social and humanities field of study) and area of residence (urban and rural areas). Ecological awareness of students is measured using the NEP 15-item scale as presented in Table 2 (Dunlap et al., 2000). The scale consists of eight even pro-NEP items and seven anti-NEP or pro-DSP odd items that provide a comprehensive scope of the essential characteristics of the ecological view of students.

Table 2. NEP scale from Dunlap et al. (2000).

Items	Statements
1.	We are approaching the limit of the number of people the earth can support.
2.	Humans have the right to modify the natural environment to suit their needs.
3.	When humans interfere with nature, it often produces disastrous consequences.
4.	Human ingenuity will ensure that we do not make the earth unlivable.
5.	Humans are severely abusing the environment.
6.	The earth has plenty of natural resources if we just learn how to develop them.
7.	Plants and animals have as much right to exist as humans.
8.	The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9.	Humans are still subject to the laws of nature despite their special abilities.
10.	The so-called "ecological crisis" facing humankind has been greatly exaggerated.
11.	The earth is like a spaceship with very limited room and resources.
12.	Humans are meant to rule over the rest of nature.
13.	The balance of nature is very delicate and easily upset.
14.	Humans will eventually learn enough about how nature works to be able to control it.
15.	If things continue on their present course, we will soon experience a major ecological catastrophe.

Note: The odd number has a pro-ecocentrism dimension while the even-oriented numbers are pro-anthropocentrism.

Respondents were requested to evaluate their level of agreement using a 5-point Likert scale where "strongly agree " was assigned a value of 5, "agree " a value of 4, "unsure " a value of 3, "disagree " a value of 2 and "strongly disagree " a value of 1 for pro-New Environmental Paradigm (pro-NEP) items. Conversely, scores for anti-NEP items or Dominant Social Paradigm (DSP) orientation were weighted as follows: "strongly agree " (1), " agree " (2), " unsure " (3), " disagree " (4), and " strongly agree " (5). The pro-NEP items, identified with odd numbers (8 items) signify pro-ecocentrism while the even-numbered items (7 items) indicate anti-NEP or DSP orientation. A high score on pro-NEP items reflects a pro-ecological perspective while a high score on anti-NEP items suggests pro-anthropocentrism (Zhushi-Etemi, Ceka, & Çadraku, 2021). The cumulative score for pro-NEP statement items ranges from a minimum of 8 to a maximum of 40. A respondent scoring above 24 (representing a neutral answer, scored 3) is considered to hold a pro-ecological perspective while a score below 24 reflects an anthropocentric view. Conversely, the highest score for anthropocentrism is 35 with a score of 21 representing a neutral position (score 3). Scores above 21 indicate an anthropocentric viewpoint while scores below 21 signify a pro-ecocentric perspective. The questionnaire was translated into Indonesian with the guidance of linguists to ensure consistency in meaning with the original questions. Responses were then aggregated and the total NEP score was analyzed.

This study analyzes whether there are differences in students' ecological awareness based on their sociodemographic characteristics including gender, year level, area of student residence, study program, stream of participants. Therefore, this study uses the NEP scale based on its construct, namely (1) reality to limits of growth (items 1, 6 and 11), (2) anti-anthropocentrism (items 2, 7 and 12), (3) fragility of nature's balance (items 3, 8 and 13), (4) anti-exceptionalism (items 4, 9 and 14) and (5) possibility of an eco-crisis (items 5, 10 and 15). In addition, this study examines whether there are differences in the orientation of ecological awareness among students (ecocentrism versus anthropocentrism) based on gender, year level, area of student residence, study program and stream of participants.

4.4. Analysis of Data

The NEP score measures the respondent's environmental awareness. NEP scores are high following ecocentric worldviews while NEP scores are low following anthropocentric worldviews. NEP scores comprised responses supporting pro-ecological or pro-anthropocentric conceptions for each statement. Conversely, a higher score for odd numbered statements for ecological items means a higher pro-ecological perspective. A higher score in an even statement represents a high anthropocentric perspective (Zhushi-Etemi et al., 2021). The study used an independent sample-t-test to test differences in surveys about student worldviews of their environment based on differences in field of study groups, gender differences, areas of residence, year level and the age group of respondents with a p-value determined at p <.05.

5. FINDINGS OF THE STUDY

5.1. Assessing the Reliability of the NEP Scale

The research uses confirmation factor analysis (CFA) to test the empirical measurement model. In the initial stages, this study used a reliability test to measure internal data consistency to measure internal data consistency. The current study found that the Cronbach's alpha values for the NEP scale based on its constructs, varied between 0.605 and 0.814. Similarly, the alpha values calculated based on the individual statement items ranged from 0.719 to 0.777. Dunlap et al. (2000) reported that the reliability of the 15-item scale when tested in Washington DC was 0.83. These results indicate slightly lower internal consistency compared to those reported in Dunlap et al's (2000) study. Table 3 presents reliability and validity testing of the NEP scale.

Table 3. Reliability and validity testing.

| NEP constructs | Items | Cronbach's alpha | | CR[a] | AVE[b] | SD[c] | SE[d] | Mean item |
		Item	Construct					
Reality to limits of growth (RG)	1	0.753	0.634	0.793	0.561	1.17	0.050	3.70
	6	0.743				1.41	0.061	2.58
	11	0.750				1.29	0.055	3.43
Anti-anthropocentrism (AA)	2	0.753	0.708	0.803	0.577	1.61	0.069	2.79
	7	0.748				1.16	0.050	3.67
	12	0.777				1.39	0.060	2.67
Fragility of nature's balance (FB)	3	0.727	0.646	0.782	0.545	1.15	0.049	3.86
	8	0.757				1.36	0.058	2.80
	13	0.730				1.12	0.048	3.79
Anti-exceptionalism (AE)	4	0.736	0.814	0.776	0.536	1.21	0.062	3.11
	9	0.725				1.10	0.046	3.70
	14	0.731				1.31	0.056	2.96
Possibility of an eco-crisis (PC)	5	0.748	0.605	0.783	0.547	1.21	0.052	3.71
	10	0.751				1.40	0.060	2.56
	15	0.719				1.25	0.054	3.82

Note: [a] Composite construction reliability.
[b] Average variance extracted.
[c] Std. deviation.
[d] Std.error mean.

Schultz and Zelezny (1999) reported alpha coefficients ranging from 0.47 to 0.81 in a study that used multidimensional analysis to examine environmental views across fourteen countries. Meanwhile, Ogunbode's (2013) investigation in Nigeria disclosed a Cronbach's alpha value of 0.61. Table 4 illustrates the internal consistency of the New Ecological Paradigm (NEP) scale encompassing both items and constructs. The Cronbach's alpha coefficients for each construct on the NEP scale varied from 0.605 to 0.814 with item-level Cronbach's alpha coefficients ranging from 0.719 to 0.777. Consequently, the reliability of each construct is deemed high surpassing the recommended threshold of 0.6. Additionally, this study employs composite construction reliability (CR) to assess the multi-item scale (Gefen, Straub, & Boudreau, 2000). The analysis indicated that each construct's CR value ranged from 0.776 to 0.803 surpassing the minimum requirement of 0.60. Furthermore, all average values of extracted variance (AVE) fell within the range of 0.536 to 0.577 exceeding the recommended threshold of 0.50.

5.2. Testing Hypotesis

We posit no discernible differences in ecological awareness among university students concerning factors such as gender, age group, year level, field of study and area of residence. In the initial hypothesis testing phase, this study examines the mean distribution of a 15-item New Ecological Paradigm (NEP) scale based on students' sociodemographic variables as outlined in Table 5. The mean distribution of students' responses falls within the moderate category ranging from 2.56 to 3.84 on a scale of 5. Notably, students' answers to some claims may be greater than others for particular items that is, 2, 6, 8, 10, 12 and 14.

Table 4. Compared mean item scale NEP (n = 545).

| NEP Items[a] | Compared mean | | | | | | | | | | $\bar{X}$ |
| | Field of study | | Gender | | Area of residence | | Year level | | Age group | | |
	Sshb[b]	Aps[c]	Male	Female	Rural	Urban	1st –2nd	3rd–up	18-21	22-25	mean
1	3.56	3.86	3.85	3.60	3.73	3.65	3.60	3.77	3.58	3.84	3.70
2	2.59	3.01	2.95	2.67	2.94	2.56	2.70	2.84	2.61	3.01	2.79
3	3.70	3.97	3.82	3.86	3.85	3.83	3.76	3.89	3.95	3.70	3.86
4	3.09	3.13	3.14	3.09	2.13	3.07	3.15	3.08	3.07	3.15	3.11
5	3.80	3.58	3.64	3.72	3.61	3.80	3.50	3.82	3.65	3.74	3.71
6	2.68	2.46	2.56	2.59	2.54	2.64	2.54	2.61	2.60	2.55	2.58
7	3.73	3.58	3.68	3.64	3.39	3.50	3.36	3.48	3.59	3.73	3.67
8	2.79	2.81	2.78	2.81	2.90	2.65	2.84	2.77	2.77	2.83	2.80
9	3.58	3.75	3.66	3.71	3.63	3.72	3.71	3.64	3.74	3.58	3.70
10	2.66	2.44	2.55	2.56	2.61	2.47	2.60	2.52	2.68	2.40	2.56
11	3.59	3.29	3.56	3.34	3.61	3.72	3.58	3.70	3.20	3.72	3.43
12	2.82	2.50	2.70	2.64	2.64	2.71	2.63	2.69	2.74	2.57	2.67
13	3.75	3.80	3.74	3.80	3.84	3.69	3.66	3.86	3.79	3.77	3.79
14	2.94	2.98	3.05	2.90	2.98	2.93	3.03	2.91	2.84	3.11	2.96
15	3.60	3.94	3.77	3.83	3.69	3.92	3.72	3.83	3.93	3.60	3.82
$\bar{X}$	2.26	3.27	3.29	3.25	3.21	3.26	3.23	3.29	3.25	3.29	3.49

Note: [a] The odd statements reflect a belief in pro-ecocentrism, while even statement items demonstrate a belief in pro-anthropocentrism beliefs.
[b] Ssh: Social sciences and humanities.
[c] Aps: Applied sciences.

The first objective of this research is to determine whether there are significant differences related to environmental awareness among university students based on study program, gender, age group, year level and area of residence. Therefore, we compared the NEP scale means based on student sociodemographic variables (see Table 4). Suppose we add up the odd statement items (pro-ecocentrism). In that case, the total value of the pro-ecocentrism statement for social science and humanities students is 29.31 while for the applied sciences study program, it is 29.77. Thus, social science, humanities and applied sciences students have pro-ecocentrism worldviews.

In contrast, students with a background in the applied sciences study program have slightly higher pro-ecocentrism worldviews than those in the social sciences and humanities program. Meanwhile, if we add up all the

even numbers (pro-anthropocentrism), social sciences and humanities students get a score of 19.57 while applied sciences students get a score of 19.33. The results show that students with a background in the social sciences, humanities and applied sciences study programs do not have a pro-anthropocentric view because the average score is below 21.

In terms of gender, the total score for the male pro-ecocentric statement was 29.57 while the female score was 29.50. Males are slightly more pro-ecocentric than females. Meanwhile, the total male score for the pro-anthropocentrism statement was 19.71 compared to 19.26 obtained by the female. This value indicates that males are more pro-anthropocentrism than females even though both do not have an anthropocentrism orientation because their total scores are below 21. If the total pro-ecocentrism score is related to the area of residence, students who live in rural areas get a score of 29.35 compared to 29.83 in urban areas. It means that students who live in urban areas tend to be more oriented towards ecocentrism than those who live in rural areas. Similarly, the anthropocentrism scores of students in urban areas were higher than those of students in rural areas namely 19.03 and 18.74, respectively. Thus, students from rural and urban areas are not pro-anthropocentrism because they have scores below the average.

Meanwhile, according to the year level variable, students in their first and second years have a lower ecocentrism score of 28.89 than those in their third year which is 29.99. This value illustrates that students at the 3rd-up year tend to be more pro-ecocentrism than those at the 1st-2nd year level. Similarly, the total anthropocentrism score of students at the 1st-2nd year was 19.49 compared to 19.42 for students in the 3rd-up level. Although not too different, students at the 1st-2nd level tend to be more anthropocentric than those at the 3rd-up level. Finally, ecocentrism scores by age group show that younger students (18-21 years) have lower scores than older students (22-25 years), 29.43 and 29.68 respectively. However, the older age group had a higher anthropocentrism score than the younger age group 19.62 and 19.31, respectively.

Meanwhile, this research uses the dependent samples t-test analysis to examine whether sociodemographic variables cause differences in ecological awareness among university students. We analyze environmental awareness based on the constructs of the NEP scale which consist of (1) reality to limit growth, (2) anti-anthropocentrism, (3) fragility of nature's balance, (4) anti-exceptionalism and (5) the possibility of an eco-crisis. We use these five constructs to determine students' environmental awareness levels. Table 5 illustrates the results of the dependent sample t-test analysis.

Table 5 presents the computational outcomes detailing the association between social demographic variables and student awareness of environmental issues measured on the New Ecological Paradigm (NEP) scale. Firstly, variations in student awareness concerning the 'reality to limits of growth' issue are evident based on gender and age group, thereby contradicting certain research hypotheses. Secondly, disparities in student awareness regarding 'anti-anthropocentrism' are observed based on the study program. In essence, students enrolled in applied sciences, social sciences and humanities study programs offer distinct perspectives on these issues. Thirdly, student awareness concerning the issue of 'anti-exceptionalism' remains consistent across sociodemographic variables. Consequently, students generally tend to disagree with the notion that humans are fundamentally different from and superior to other entities in the natural world. Lastly, differences in student awareness of the 'fragility of nature's balance' and 'the possibility of an eco-crisis' are noted based on the study program. This outcome challenges certain research hypotheses asserting the absence of differences in students' awareness of these constructs.

Table 5. Test results for ecological awareness among students according to study programs, gender, age group, year level and area of residence.

NEP constructs	Levene's test for equality of variances		t-test for equality of means						Hypothesis[c]
	F	Sig.	t	df	Sig.(2-tailed)	MD[a]	SED[b]	
The reality of the limits of growth									
Gender	1.787	0.182	2.977	543	0.041	0.702	0.236	Not supported
Age group	1.606	0.206	-2.516	543	0.001	-0.588	0.234	Not supported
Year level	5.886	0.016	-1.848	543	0.065	-0.438	0.237	Supported
Study program	0.110	0.740	-1.781	543	0.075	-0.416	0.233	Supported
Area of residents	2.934	0.087	-436	543	0.663	-0.104	0.238	Supported
Anti-anthropocentrism									
Gender	0.258	0.612	0.555	543	0.579	0.116	0.208	Supported
Age group	3.608	0.058	0.314	543	0.754	0.065	0.206	Supported
Year level	2.457	0.118	-1.491	543	0.137	-0.310	0.208	Supported
Study program	1.853	0.174	1.992	543	0.047	0.407	0.204	Not supported
Area of residents	0.229	0.633	-1.554	543	0.121	-0.324	0.209	Supported
Anti-exceptionalism									
Gender	2.774	0.096	-0.582	543	0.561	-0.137	0.235	Supported
Age	16.561	0.000	0.084	543	0.933	0.019	0.232	Supported
Year level	0.000	0.984	0.785	543	0.433	0.184	0.234	Supported
Study program	16.533	0.000	-0.098	543	0.992	-0.023	0.231	Supported
Area of residents	2.131	0.145	0.383	543	0.702	0.090	0.235	Supported
Fragility of nature's balance									
Gender	8.715	0.003	-0.744	543	0.457	-0.171	0.230	Supported
Age group	8.112	0.005	1.724	543	0.085	0.391	0.227	Supported
Year level	2.263	0.125	-1.628	543	0.104	-0.373	0.229	Supported
Field of study	10.942	0.001	2.765	543	0.006	0.622	0.225	Not supported
Area of residents	2.043	0.154	1.055	543	0.292	0.243	0.230	Supported
Possibility of an eco-crisis									
Gender	1.046	0.307	-1.525	543	0.128	-0.383	0.251	Supported
Age group	1.545	0.214	3.095	543	0.002	0.763	0.247	Not supported
Year level	2.437	0.119	-1.689	543	0.468	-0.031	0.042	Supported
Study program	2.327	0.128	2.742	543	0.006	0.675	0.246	Not supported
Area of residents	1.157	0.283	-1.804	543	0.072	-0.454	0.248	Supported

Note: [a] Mean differences.
[b] Std. error differences.
[c] $p > 0.05$ supported the hypothesis.

We analyzed whether there are differences in students' orientations towards anthropocentrism (even-numbered statements) and ecocentrism (odd-numbered statements) to strengthen the hypothetical conclusions of the study. Table 6 illustrates the ecological awareness according to the students' orientations. Table 6 illustrates the differences in students' worldviews towards the ecocentrism and anthropocentrism orientations.

Students at different grade levels may have varying levels of exposure to environmental education and awareness campaigns. Higher-level students may have had more opportunities to learn about ecological issues leading to a stronger orientation towards ecocentrism and a rejection of anthropocentrism. On the other hand, it's possible that less exposed lower-level students have a stronger anthropocentrism tendency and a weaker orientation towards ecocentrism.

Table 6. Test results for ecological beliefs according to field of studies, gender, age group, year level, and area of residence.

Students' orientations	Levene's test for equality of variances	t-test for equality of means						Hypothesis[c]
	F	Sig.	t	df	Sig.(2-tailed)	MD[a]	SED[b]	
Ecocentrism								
Gender	0.381	0.537	0.159	543	0.873	0.070	0.441	Supported
Age	16.100	0.001	-0.832	543	0.406	-0.362	0.435	Supported
Year level	1.903	0.168	-2.381	543	0.018	-1.043	0.438	Not supported
Field of study	8.657	0.003	-0.541	543	0.589	-0.235	0.434	Supported
Area of residents	4.923	0.027	-0.987	543	0.324	-0.436	0.442	Supported
Anthopocentrism								
Gender	1.530	0.217	1.307	543	0.192	0.477	0.365	Supported
Age	0.378	0.539	-.829	543	0.408	-0.299	0.361	Supported
Year level	0.011	0.917	.194	543	0.846	0.071	0.366	Supported
Field of study	0.639	0.425	.707	543	0.480	0.255	0.360	Supported
Area of residents	5.449	0.020	1.911	543	0.047	0.699	0.366	Not supported

Note: [a] Mean differences.
[b] Std. error differences.
[c] $p > 0.05$ supported the hypothesis.

Meanwhile, there were differences in anthropocentrism based on the area of residence variable. The place of residence can play a role in shaping individuals' perspectives and attitudes towards the environment. Different regions may have varying levels of environmental consciousness and cultural values that impact how students perceive and respond to anthropocentrism. For example, urban areas may emphasize sustainability and ecological awareness more than rural areas. Students living in different regions may have access to other environmental resources and experiences. Those in urban areas may have greater exposure to eco-friendly initiatives such as recycling programs or renewable energy projects which can foster a stronger orientation towards ecocentrism. On the other hand, students in rural areas may have more traditional views influenced by their direct dependence on natural resources resulting in a higher acceptance of DSP. Overall, year level and area of residence variables can affect students' exposure to environmental education, cultural influences and access to environmental resources all of which can shape their orientation towards anthropocentrism.

6. DISCUSSION

This study aims to determine whether the sociodemographic background of students in Gen Z results in differences in environmental orientation (ecocentrism vs. anthropocentrism). These variables include study programs, age group, year level, gender and area of residence. We started by analyzing the frequency and mean distribution of the NEP scale items and students' responses to the NEP items to achieve this goal. The present study found that the average mean for statement items with anthropocentrism dimensions was lower than for ecocentrism-oriented statement items.

Then, we analyzed whether there were differences in students' environmental awareness of the five NEP constructs based on their sociodemographic characteristics. The findings show differences in students' awareness of 'reality to limits of growth' according to gender and age group. This result differs from previous studies' findings (Özgür et al., 2018; Rashid, (2018). There was no significant difference in the level of environmental awareness between male and female college students which is different from the results of this research. Meanwhile, there are significant differences in student awareness of the issues of 'anti-anthropocentrism, the fragility of nature's balance and the possibility of an eco-crisis based on the background of the study program. The results of this study contradict the findings of Banga and Rajni (2016) that there are no significant differences between science and art students based on environmental awareness. However, it was found that there was no difference in students'

awareness of the construct based on their sociodemographic background regarding the issue of "anti-exceptionalism".

Finally, we analyzed whether differences in students' sociodemographic characteristics led to differences in environmental orientation (ecocentrism versus anthropocentrism). The analysis results show differences in ecocentrism orientation among students based on year-level variables while other variables are not proven to be significant. These findings also align with previous research that gender and the choice of course do not affect their anthropocentric or ecocentric approach to environmental issues (Alagoz & Akman, 2016; Kopnina & Cocis, 2017). On the other hand, there are differences in student anthropocentrism orientation based on the area of residents. This finding is in line with the findings of Rashid (2018) who found that there is a significant difference between rural and urban college students in their environmental awareness.

According to the results of the current study, Generation Z shows a somewhat anthropocentric perspective and is mainly pro-environmental or ecocentric. The variables of the study program, gender, age group and area of residence did not significantly influence students' responses to certain ecocentrism-oriented New Environmental Paradigm (NEP) statement items. However, the variable of year level demonstrated a significant impact on their perspectives. Conversely, the study program, gender, age group and year level did not have a notable effect on students' viewpoints regarding NEP statements oriented towards anthropocentrism except for the area of residence variable which showed a significant difference. These findings diverge from a study by Loverio et al. (2022) which reported significant effects of students' course, major, gender and year level on their responses to certain NEP statements particularly those associated with anthropocentric viewpoints.

According to Kaltenborn and Bjerke (2002), an anthropocentric view positively correlates with an agricultural or rural environment. This finding aligns with Rachmatullah et al.'s (2020) research on preservice science teachers in Indonesia indicating that Indonesian preservice science teachers tend to hold a more anthropocentric or egotistical worldview associated with agricultural-based rural communities. Grúňová et al. (2019) suggest that respondents may concurrently possess both perspectives regarding pro-ecocentrism and anthropocentrism. This dual stance is attributed to the life principles prevalent in rural communities where there is a belief in the human duty to establish harmony with nature. It implies that religious beliefs may also influence respondents' responses allowing for the simultaneous endorsement of both pro-ecocentric and pro-anthropocentric views highlighting their non-mutually exclusive nature.

Gen Z university students frequently have different values and priorities compared to earlier generations. They emphasize social justice, sustainability and inclusivity (Singh & Dangmei, 2016). Gen Z has grown up in a time marked by heightened environmental awareness and concerns about climate change and ecological degradation (Bailey, Wills, & Mitchem, 2022; Kamenidou, Mamalis, Pavlidis, & Bara, 2019; Reyes, Carmen, Luminarias, Mangulabnan, & Ogunbode, 2021). This generation has witnessed and experienced the impacts of environmental issues firsthand. Gen Z individuals have had increased access to information and education on environmental topics. They are more likely to have been exposed to environmental education, sustainability initiatives and campaigns promoting ecological consciousness (Bonnett, 2017; Chawla & Derr, 2012). Gen Z has advocated social and cultural movements for environmental justice and sustainability such as youth-led climate strikes and environmental activism.

The age group and field of study variables cause differences in students' perspectives on the 'possibility of eco-crises' construct. The possibility of an eco-crisis refers to the potential occurrence of a severe and widespread ecological crisis characterized by significant environmental degradation, biodiversity loss and disruptions to ecosystem functioning. Humans are severely abusing the environment. The so-called "ecological crisis" facing humankind has been greatly exaggerated. A massive ecological catastrophe will soon experience if current events continue as they are. For the following reasons, age and field of study background variables can cause differences in students' perspectives on the 'possibility of eco-crises' construct among Gen Z. First, as a younger generation,

Gen Z has grown up in an era marked by increasing awareness of environmental challenges and ecological crises. They have witnessed and experienced the impacts of climate change, biodiversity loss and other environmental issues (Ross & Rouse, 2022; Ross, Rouse, & Mobley, 2019). As a result, younger Gen Z individuals may exhibit heightened concern and awareness regarding the possibility of eco-crises compared to older age groups. Second, the field of study focusing on environmental sciences, sustainability or ecological studies provides students with in-depth knowledge about environmental issues, including the potential for eco-crises (Auya-Dica et al., 2022; Danielraja, 2019; Estrada-Araoz, Gallegos Ramos, Paredes Valverde, Quispe Herrera, & Mori Bazán, 2023). These programs emphasize the interconnectedness of human activities and the environment, the risks posed by unsustainable practices and the need for urgent action. Students from these programs are more likely to have a heightened perspective on the possibility of eco-crises.

7. CONCLUSION

This study explores ecological awareness among university students by applying the NEP scale considering their sociodemographic variables such as gender, age group, year level, field of study and area of residence. This study hypothesizes that there are no differences in ecological awareness among university students based on sociodemographic backgrounds considering that university students belong to Generation Z which has grown and developed on a digital platform with unlimited access to information. In other words, sociodemographic factors do not determine Generation Z's ecological awareness level. This study measures ecological awareness through participants' responses to a 15-item NEP scale which operationalizes five NEP constructs. These constructs include the reality of limits to growth, anti-anthropocentrism, anti-exceptionalism, the fragility of nature's balance and the possibility of eco-crises.

We provide an overview of several findings based on the data on university students' ecological awareness.

1. Gender and age group variables influence awareness of the 'reality to limits of growth' construct: The study indicates differences in awareness of this construct based on gender and age. It suggests that males and females as well as different age groups may perceive and understand the limitations of growth differently in the context of ecological issues.

2. The field of studies influences perspectives on the 'anti-anthropocentrism' construct. The findings reveal that students' perspectives on 'anti-anthropocentrism' vary based on their field of study. It suggests that different academic disciplines shape students' viewpoints on the relationship between humans and the environment highlighting the influence of educational background in shaping ecological awareness.

3. Sociodemographic characteristics do not affect students' worldviews regarding 'anti-exceptionalism'. The study indicates no differences in students' worldview concerning the ' anti-exceptionalism' construct based on their sociodemographic characteristics. It suggests that factors such as gender, age group, year level and study program variables may not significantly shape students' understanding of the non-exceptional nature of humans within the environment.

4. Study programs impact awareness of the 'fragility of nature's balance' construct. The findings suggest that students' study program influence their awareness of the 'fragility of nature's balance' construct. Different academic disciplines may contribute to varying levels of understanding regarding the delicate equilibrium of the natural world.

5. Age group and study program affect perspectives on the 'possibility of eco-crises' construct: The study shows differences in students' perspectives on the 'possibility of eco-crises' construct based on age group and study program. Age-related experiences and academic disciplines may influence how students perceive the likelihood of ecological crises occurring.

In a nutshell, these findings emphasize the importance of considering these factors when designing interventions and educational programs to enhance ecological awareness and sustainability practices among

university students. In addition, the study's findings can provide insights into university students' environmental values and perspectives helping inform environmental education programs, policy-making and initiatives aimed at promoting sustainability on campuses. It can also contribute to understand how different demographic factors may shape individuals' ecological worldviews and guide efforts to foster a more environmentally aware group of university students.

8. POLICY SUGGESTIONS AND IMPLICATION

1. The authors developed several policy recommendations and consequences based on the research findings which are outlined below: Introduce comprehensive environmental education programs in schools and universities designed to resonate with the ecocentrism and anthropocentrism beliefs of Generation Z. Cultivating a deeper understanding of ecological issues at an early stage of education can lead to the emergence of a more environmentally aware and well-informed generation allowing for the generation of solutions that align with their values.

2. Allocate funding and resources to support grassroots environmental initiatives driven by young individuals and organizations. Empowering Generation Z to play active roles in ecological projects enhances their sense of agency and contributes to concrete positive changes within local communities.

3. It is important to develop policies that empower young individuals to engage in ecological policy discussions to encourage and enable the active participation of Generation Z in environmental decision-making processes.

We can work towards a more sustainable and environmentally conscious future by bridging the gap between Generation Z's ecocentrism and anthropocentrism beliefs and implementing actionable measures. These policy suggestions aim to cultivate inclusive and forward-thinking attitudes, behaviors and systemic approaches to address pressing environmental challenges.

REFERENCES

Adnan, A., Ahmad, A., & Khan, M. N. (2017). Examining the role of consumer lifestyles on ecological behavior among young Indian consumers. *Young Consumers, 18*(4), 348-377. https://doi.org/https://doi.org/10.1108/YC-05-2017-00699

Akgül, B. M., Birinci, C., Göral, Ş., & Karaküçük, S. (2017). An investigation of ecocentric and anthropocentric attitudes and antipathy towards environment in athletes. *Journal of Human Sciences, 14*(4), 3405-3414. https://doi.org/10.14687/jhs.v14i4.4680

Alagoz, B., & Akman, O. (2016). Anthropocentric or ecocentric environmentalism? Views of university students. *Higher Education Studies, 6*(4), 34-53. https://doi.org/10.5539/hes.v6n4p34

Amburgey, J. W., & Thoman, D. B. (2012). Dimensionality of the new ecological paradigm: Issues of factor structure and measurement. *Environment and Behavior, 44*(2), 235-256. https://doi.org/10.1177/0013916511402064

Arcury, T. A., & Christianson, E. H. (1990). Environmental worldview in response to environmental problems: Kentucky 1984 and 1988 compared. *Environment and Behavior, 22*(3), 387-407.

Arrobas, F., Ferreira, J., Brito-Henriques, E., & Fernandes, A. (2020). Measuring tourism and environmental sciences students' attitudes towards sustainable tourism. *Journal of Hospitality, Leisure, Sport & Tourism Education, 27*, 100273.

Atav, E., Altunoğlu, B. D., & Sönmez, S. (2015). The determination of the environmental attitudes of secondary education students. *Procedia-Social and Behavioral Sciences, 174*, 1391-1396. https://doi.org/10.1016/j.sbspro.2015.01.765

Auya-Dica, A., Sutthikun, W., Cababat, F., Dayupay, J., Pham, L., & Oyebode, O. (2022). Study the relationship between environmental knowledge and environmental values using environmental education. *Ournal of Biodiversity and Environmental Sciences, 21*(2), 77–85.

Badan Pusat Statistik Central Statistics Agency. (2021). *2020 population census results.* Jakarta: BPS.

Bailey, A. J., Wills, C. M., & Mitchem, J. (2022). Attitudes towards climate change and scientific stories. *Journal of Environmental Studies and Sciences, 12*(4), 714-726.

Baldassare, M., & Katz, C. (1992). The personal threat of environmental problems as predictor of environmental practices. *Environment and Behavior, 24*(5), 602-616. https://doi.org/10.1177/0013916592245002

Banga, C. L., & Rajni. (2016). Study and compare the environmental awareness among science and arts students of Ludhiana district of Punjab. *Scholarly Research Journal for Interdiciplinary Studies, 3*(23), 1655–1654.

Barr, S., & Gilg, A. (2006). Sustainable lifestyles: Framing environmental action in and around the home. *Geoforum, 37*(6), 906-920. https://doi.org/https://doi.org/10.1016/j.geoforum.2006.05.002

Bechtel, R. B., Corral-Verdugo, V., Asai, M., & Riesle, A. G. (2006). A cross-cultural study of environmental belief structures in USA, Japan, Mexico, and Peru. *International Journal of Psychology, 41*(02), 145-151. https://doi.org/10.1080/00207590500345401

Benckendorff, P., Moscardo, G., & Murphy, L. (2012). Environmental attitudes of generation Y students: Foundations for sustainability education in tourism. *Journal of Teaching in Travel and Tourism, 12*(1), 44–69. https://doi.org/https://doi.org/10.1080/15313220.2012.650063

Berning, H., North, C., Stevens, S., & Clarke, T. (2023). Deconstructing the anthropocentrism versus ecocentrism binary through Māori oral fire traditions. *Journal of Outdoor and Environmental Education*, 1-18. https://doi.org/10.1007/s42322-023-00128-2

Bonnett, M. (2017). Post-sustainability and environmental education. In B. Jickling & S. Sterling (Eds.), Remaking education for the future. In. UK: Palgrave Macmillan.

Casey, P. J., & Scott, K. (2006). Environmental concern and behaviour in an Australian sample within an ecocentric–anthropocentric framework. *Australian Journal of Psychology, 58*(2), 57-67. https://doi.org/https://doi.org/10.1080/00049530600730419

Chawla, L., & Derr, V. (2012). The development of conservation behaviours in childhood and youth. In S. Clayton (Ed.), The Oxford handbook of environmental and conservation, psychology. In (pp. 527–555). Oxford, UK: Oxford University Press.

Cotton, R. D., & Alcock, I. (2013). Commitment to environmental sustainability in the UK student population. *Studies in Higher Education, 38*(10), 1457-1471. https://doi.org/https://doi.org/10.1080/03075079.2011.627423

Dabija, D.-C., Bejan, B. M., & Dinu, V. (2019). How sustainability oriented is Generation Z in retail? A literature review. *Transformations in Business & Economics, 18*(2), 140–155.

Danielraja, R. (2019). A study of environmental awareness of students at higher secondary level. *Shanlax International Journal of Education, 7*(3), 6-10. https://doi.org/https://doi.org/10.34293/education.v7i3.480

De Groot, J. I., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior, 40*(3), 330-354. https://doi.org/https://doi.org/10.1177%2F0013916506297831

De Lucia, V. (2017). Beyond anthropocentrism and ecocentrism: A biopolitical reading of environmental law. *Journal of Human Rights and the Environment, 8*(2), 181-202. https://doi.org/10.4337/jhre.2017.02.01

Dimitriou, C. K., & AbouElgheit, E. (2019). Understanding generation Z's travel social decision-making. *Tourism and Hospitality Management, 25*(2), 311-334. https://doi.org/https://doi.org/10.20867/thm.25.2.4

Droz, L. (2022). Anthropocentrism as the scapegoat of the environmental crisis: A review. *Ethics in Science and Environmental Politics*, *22*, 25-49. https://doi.org/10.3354/esep00200

Dunlap, R. E. (2008). The new environmental paradigm scale: From marginality to worldwide use. *The Journal of Environmental Education*, *40*(1), 3-18. https://doi.org/10.3200/joee.40.1.3-18

Dunlap, R. E., & Van Liere, K. D. (1978). The "new environmental paradigm". *The Journal of Environmental Education*, *9*(4), 10-19.

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). New trends in measuring environmental attitudes: Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, *56*(3), 425-442. https://doi.org/10.1111/0022-4537.00176

Estrada-Araoz, E. G., Gallegos Ramos, N. A., Paredes Valverde, Y., Quispe Herrera, R., & Mori Bazán, J. (2023). Examining the relationship between environmental education and pro-environmental behavior in regular basic education students: A cross-sectional study. *Social Sciences*, *12*(5), 307. https://doi.org/https://doi.org/10.3390/socsci12050307

Gangaas, K. E., Kaltenborn, B. P., & Andreassen, H. P. (2015). Environmental attitudes associated with large-scale cultural differences, not local environmental conflicts. *Environmental Conservation*, *42*(1), 41-50. https://doi.org/DOI:10.1017/S0376892914000125

Gefen, D., Straub, D., & Boudreau, M.-C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*, *4*(1), 7. https://doi.org/http://dx.doi.org/10.17705/1CAIS.00407

Gerhard, L. C. (2004). Climate change: Conflict of observational science, theory, and politics. *Aapg Bulletin*, *88*(9), 1211-1220. https://doi.org/https://doi.org/10.1306/03220403107

Grúňová, M., Sané, M., Cincera, J., Kroufek, R., & Hejcmanová, P. (2019). Reliability of the new environmental paradigm for analysing the environmental attitudes of Senegalese pupils in the context of conservation education projects. *Environmental Education Research*, *25*(2), 211-221. https://doi.org/https://doi.org/10.1080/13504622.2018.1428942

Harraway, J., Broughton-Ansin, F., Deaker, L., Jowett, T., & Shephard, K. (2012). Exploring the use of the revised new ecological paradigm scale (NEP) to monitor the development of students' ecological worldviews. *The Journal of Environmental Education*, *43*(3), 177-191. https://doi.org/DOI:10.1080/00958964.2011.634450

Howell, S. E., & Laska, S. B. (1992). The changing face of the environmental coalition: A research note. *Environment and Behavior*, *24*(1), 134-144. https://doi.org/10.1177/0013916592241006

Huan, Y., Li, H., & Liang, T. (2019). A new method for the quantitative assessment of sustainable development goals (SDGs) and a case study on Central Asia. *Sustainability*, *11*(13), 3504. https://doi.org/10.3390/su11133504

Hunter, L. M., & Rinner, L. (2004). The association between environmental perspective and knowledge and concern with species diversity. *Society and Natural Resources*, *17*(6), 517-532. https://doi.org/https://doi.org/10.1080/08941920490452454

Johnson, C. Y., Bowker, J. M., & Cordell, H. K. (2004). Ethnic variation in environmental belief and behavior: An examination of the new ecological paradigm in a social psychological context. *Environment and Behavior*, *36*(2), 157-186. https://doi.org/10.1177/0013916503251478

Kaltenborn, B. P., & Bjerke, T. (2002). Associations between environmental value orientations and landscape preferences. *Landscape and Urban Planning*, *59*(1), 1-11. https://doi.org/https://doi.org/10.1016/S0169-2046(01)00243-2

Kamenidou, I. C., Mamalis, S. A., Pavlidis, S., & Bara, E.-Z. G. (2019). Segmenting the generation Z cohort university students based on sustainable food consumption behavior: A preliminary study. *Sustainability*, *11*(3), 837. https://doi.org/https://doi.org/10.3390/su11030837

Kiely, L., Parajuly, K., Green, J. A., & Fitzpatrick, C. (2021). Education for UN sustainable development goal 12: A cross-curricular program for secondary level students. *Frontiers in Sustainability*, *2*, 638294. https://doi.org/https://doi.org/10.3389/frsus.2021.638294

Kopnina, H., & Cocis, A. (2017). Testing ecocentric and anthropocentric attitudes toward the sustainable development (EAATSD) scale with bachelor students. *European Journal of Sociology and Anthropology, 2*(1), 2. https://doi.org/doi:10.20897/ejsa.201702

Leung, C., & Rice, J. (2002). Comparison of Chinese-Australian and Anglo-Australian environmental attitudes and behavior. *Social Behavior and Personality: An International Journal, 30*(3), 251-262. https://doi.org/http://dx.doi.org/10.2224/sbp.2002.30.3.251

Levine, D., & Strube, M. (2012). Environmental attitudes, knowledge, intentions and behaviors among college students. *The Journal of Social Psychology, 152*(3), 308–326. https://doi.org/DOI:10.1080/00224545.2011.604363

López-Bonilla, L. M., & López-Bonilla, J. M. (2016). From the new environmental paradigm to the brief ecological paradigm: A revised scale in golf tourism. *Anatolia, 72*(2), 227–236. https://doi.org/https://doi.org/10.1080/13032917.2015.1100128

Loverio, J. P., Shen, C. C., & Chen, L. (2022). Environmental awareness of tourism and hospitality (Generation Z) students. *Journal of Responsible Tourism Management, 2*(2), 1–20. https://doi.org/DOI:10.47263/JRTM.02-02-02

Nguyen, T. N., Lobo, A., & Greenland, S. (2017). The influence of cultural values on green purchase behaviour. *Marketing Intelligence & Planning, 35*(3), 377–396. https://doi.org/https://psycnet.apa.org/doi/10.1108/MIP-08-2016-0131

Noor, M. N. M., Jumain, R. S. A., Yusof, A., Ahmat, M. A. H., & Kamaruzaman, I. F. (2017). Determinants of generation Z green purchase decision: A SEM-PLS approach. *International Journal of Advanced and Applied Sciences, 4*(11), 143-147. https://doi.org/https://doi.org/10.21833/ijaas.2017.011.023

Nord, M., Luloff, A., & Bridger, J. C. (1998). The association of forest recreation with environmentalism. *Environment and Behavior, 30*(2), 235-246. https://doi.org/https://doi.org/10.1177%2F0013916598302006

Ntanos, S., Arabatzis, G., & Tsiantikoudis, S. (2017). Investigation of the relationship between ecological sensitivity and renewable energy investment acceptance by using the NEP scale. *CEUR Workshop Proceedings, 2017*, 561-570.

Ntanos, S., Kyriakopoulos, G., Skordoulis, M., Chalikias, M., & Arabatzis, G. (2019). An application of the new environmental paradigm (NEP) scale in a Greek context. *Energies, 12*(2), 1–18. https://doi.org/10.3390/en12020239

Ogunbode, C. A. (2013). The NEP scale: Measuring ecological attitudes/worldviews in an African context. *Environment, Development and Sustainability, 15*(6), 1477-1494. https://doi.org/DOI:10.1007/s10668-013-9446-0

Özgür, S., Varoğlu, L., & Yılmaz, A. (2018). *Environment from a different perspective: Analysing the environmental problem awareness of undergraduates.* Paper presented at the SHS Web of Conferences 48, ERPA International Congresses on Education.

Parzonko, A. J., Balińska, A., & Sieczko, A. (2021). Pro-environmental behaviors of Generation Z in the context of the concept of homo socio-oeconomicus. *Energies, 14*(6), 1597. https://doi.org/DOI:10.3390/en14061597

Pizmony-Levy, O., & Ostrow, M. (2018). Pro-environmental attitudes and behaviors in higher education: Investigating the role of formal and informal factors. *Columbia Academic Commons*, 1–39.

Poortinga, W., Steg, L., & Vlek, C. (2004). Values, environmental concern, and environmental behavior: A study into household energy use. *Environment and Behavior, 36*(1), 70-93.

Priporas, C.-V., Stylos, N., & Fotiadis, A. K. (2017). Generation Z consumers' expectations of interactions in smart retailing: A future agenda. *Computers in Human Behavior, 77*, 374-381. https://doi.org/https://doi.org/10.1016/j.chb.2017.01.058

Putrawan, I. M. (2019). A comparative analysis of new ecological paradigm (NEP), ecosystem knowledge, and students' self-control based on gender. *International Journal of Innovative Technology and Exploring Engineering, 8*(6), 68–71.

Rachmatullah, A., Lee, J.-K., & Ha, M. (2020). Preservice science teachers' ecological value orientation: A comparative study between Indonesia and Korea. *The Journal of Environmental Education, 51*(1), 14-28. https://doi.org/https://doi.org/10.1080/00958964.2019.1633989

Rashid, S. (2018). A study on environmental awareness among collegestudents with special reference to male-female and rural-urban dichotomy. *AGU International Journal of Research in Social Sciences & Humanities, 6*(6), 643–649.

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Reyes, M. E. S., Carmen, B. P. B., Luminarias, M. E. P., Mangulabnan, S. A. N. B., & Ogunbode, C. A. (2021). An investigation into the relationship between climate change anxiety and mental health among Gen Z Filipinos. *Current Psychology*, 1-9. https://doi.org/doi:10.1007/s12144-021-02099-3

Ross, A. D., & Rouse, S. M. (2022). Generations as social identities: The role of latino*millennial/generation z in shaping attitudes about climate change. *Political Behavior*, *44*(3), 1105-1124. https://doi.org/https://doi.org/10.1007/s11109-020-09649-8

Ross, A. D., Rouse, S. M., & Mobley, W. (2019). Polarization of climate change beliefs: The role of the millennial generation identity. *Social Science Quarterly*, *100*(7), 2625-2640. https://doi.org/https://doi.org/10.1111/ssqu.12640.

Rülke, J., Rieckmann, M., Nzau, J. M., & Teucher, M. (2020). How ecocentrism and anthropocentrism influence human–environment relationships in a Kenyan biodiversity hotspot. *Sustainability*, *12*(19), 8213. https://doi.org/10.3390/su12198213

Sakdiyakorn, M., Golubovskaya, M., & Solnet, D. (2021). Understanding generation Z through collective consciousness: Impacts for hospitality work and employment. *International Journal of Hospitality Management*, *94*, 102822. https://doi.org/https://doi.org/10.1016/j.ijhm.2020.102822

Samdahl, D. M., & Robertson, R. (1989). Social determinants of environmental concern: Specification and test of the model. *Environment and Behavior*, *21*(1), 57-81. https://doi.org/https://doi.org/10.1177/0013916589211004

Schultz, P. W., & Zelezny, L. (1999). Values as predictors of environmental attitudes: Evidence For consistency across 14 countries. *Journal of Environmental Psychology*, *19*(3), 255–265. https://doi.org/https://doi.org/10.1006/jevp.1999.0129

Seemiller, C., & Grace, M. (2016). *Generation Z goes to college.* San Francisco, CA: Jossey-Bass.

Sharmin, F., Sultan, M. T., Badulescu, A., Bac, D. P., & Li, B. (2020). Millennial tourists' environmentally sustainable behavior towards a natural protected area: An integrative framework. *Sustainability*, *12*(20), 8545. https://doi.org/10.3390/su12208545

Singh, A. P., & Dangmei, J. (2016). Understanding the generation Z: The future workforce. *South-Asian Journal of Multidisciplinary Studies*, *3*(3), 1-5.

Sousa, E., Quintino, V., Palhas, J., Rodrigues, A. M., & Teixeira, J. (2016). Can environmental education actions change public attitudes? An example using the pond habitat and associated biodiversity. *PloS One*, *11*(5), e0154440. https://doi.org/https://doi.org/10.1371/journal.pone.0154440

Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior*, *25*(5), 322-348. https://doi.org/10.1177/0013916593255002

Stern, P. C., Kalof, L., Dietz, T., & Guagnano, G. A. (1995). Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects 1. *Journal of Applied Social Psychology*, *25*(18), 1611-1636. https://doi.org/10.1111/j.1559-1816.1995.tb02636.x

Van den Bergh, J., & Pallini, K. (2018). Marketing to generation Z. *Research World*, *70*, 18-23. https://doi.org/https://doi.org/10.1002/rwm3.20660

Van Liere, K. D., & Dunlap, R. E. (1981). Environmental concern: Does it make a difference how it's measured? *Environment and Behavior*, *13*(6), 651-676.

Vorontsova-Wenger, O., Ghisletta, P., Ababkov, V., & Barisnikov, K. (2021). Relationship between mindfulness, psychopathological symptoms, and academic performance in university students. *Psychological Reports*, *124*(2), 459-478. https://doi.org/10.1177/0033294119899906

Wells, M., & Petherick, L. (2016). New ecological paradigm and sustainability attitudes with respect to a multi-cultural educational milieu in China. *International Association for Development of the Information Society*, 311–316.

Xiao, C., & Buhrmann, J. (2017). The structure and coherence of the new environmental paradigm: Reconceptualizing the dimensionality debate. *Human Ecology Review*, *23*(1), 179-198. https://doi.org/10.22459/HER.23.01.2017.09

Yates, A., Lou, Y., Mobley, C., & Shealy, E. (2015). Changes in public and private environmentally responsible behaviors by gender: Findings from the 1994 and 2010 general social survey. *Sociological Inquiry, 85*(4), 503–532. https://doi.org/https://doi.org/10.1111/soin.12089

Zhushi-Etemi, F., Ceka, R., & Çadraku, H. (2021). The use of NEP scale to evaluate the environmental worldview of the employees in the city of Kacanik in Republic of Kosovo. *Environment Development and Sustainability, 22*(7), 8195-8211. https://doi.org/DOI:10.1007/s10668-020-00958-w

Zilahy, G., & Huisingh, D. (2009). The roles of academia in regional sustainability initiatives. *Journal of Cleaner Production, 17*(12), 1057-1066. https://doi.org/DOI:10.1016/j.jclepro.2009.03.018