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Research Article

Pre-Service Teachers' Ethical Reasoning about Climate Ethics and Climate Justice

Öğretmen Adaylarının İklim Etiği ve İklim Adaleti Konusundaki Etik Muhakemeleri

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ABSTRACT

The climate crisis is an ethical issue besides being an environmental problem. Therefore, examining pre-service teachers' ethical reasoning about climate change is crucial since they will educate future global citizens. To achieve this aim, this study probed into pre-service teachers' reasoning on climate ethics and climate justice by asking them to answer the questions in two different reflections. The participants of the current study were 31 pre-service teachers (10 males, 21 females) who study in the English Language Teaching Program at the Faculty of Education at a private university in Turkey. In the 1st reflection, they identified and justified ethical issues regarding climate change and discuss how they could teach them in their class. The 2nd reflection asked them to discuss climate justice and design an instruction to teach climate justice by using a story and a game. The results suggest identifying and naming the ethical issue as climate justice and asking pre-service teachers to design teaching on stories and games in a structured way to facilitate ethical reasoning.

Keywords: Climate ethics, climate justice, ethical reasoning, interdisciplinary environmental education, sustainability.

ÖZ

İklim krizi, bir çevre problemi olmasının yanı sıra, etik bir sorundur. Bu bağlamda, geleceğin küresel vatandaşlarını öğretmenlerin yetiştireceği bakış açısıyla, öğretmen adaylarının iklim değişikliğiyle ilgili etik muhakemelerini incelemek çok önemlidir. Bu amaçla, bu çalışmada öğretmen adaylarının iki farklı yansıtma soruları ile iklim etiği ve iklim adaleti konusundaki etik muhakemeleri ayrıntılı olarak incelenmiştir. Bu makalede sunulan araştırmanın katılımcıları Türkiye'de özel bir üniversitenin Eğitim Fakültesi İngilizce Öğretmenliği Programında öğrenim gören 31 (10 erkek, 21 kadın) öğretmen adayıdır. İklim etiği muhakemelerini incelemek amacıyla oluşturulan birinci yansıtmada katılımcılar, iklim değişikliği ile ilgili etik sorunları belirleyerek iklim değişikliğiyle ilgili bu etik sorunları nasıl öğreteceklerini tartışmışlardır. İklim adaleti ile ilgili etik muhakemelerini incelemek amacıyla oluşturulan ikinci yansıtmada ise bu katılımcılardan iklim adaletini tartışmaları ve daha sonra bir hikâye kullanarak ve bu hikâyeye dayanan oyun tasarlayarak iklim adaletini anlatan bir öğretim tasarlamaları istenmiştir. Bu çalışmanın sonuçları, etik sorunu iklim adaleti olarak tanımlamaya ve öğretmen adaylarının öğretimlerini hikayeler ve oyunlar temelinde yapılandırmanın etik muhakemeyi kolaylaştıracağına işaret etmektedir.

Anahtar Kelimeler: Etik muhakeme, iklim adaleti, iklim etiği, disiplinlerarası çevre eğitimi, sürdürülebilirlik.

INTRODUCTION

Although there are various conceptualizations of social justice (SJ) depending on different ideologies, its conception mainly depends on an egalitarian and democratic society in which the principles of equity, solidarity, human rights, and equal participation of people from diverse social identity groups (Bell, 2016; Zajda et al., 2006). Science has a significant role in contributing to public policy by eliciting injustice and suggesting solutions by providing evidence. Science, thus, can contribute to social justice by providing trustworthy information rather than any kind of political action. Global climate change is probably the most crucial issue in today's world. Yet, many people call it a hoax, scam, or fraud by dismissing the scientific consensus. The problem of climate change denial is in communicating science rather than a lack of scientific knowledge (Allchin, 2020). Therefore, science educators should find new ways to communicate science in general, and specifically climate change.

Climate change raises the following questions (Broome, 2008): How should humans ensure the well-being of future generations? Will all of the people experience the same severe consequences of climate change? Are rich people committing an injustice against the world's poor by emitting greenhouse gases? How should we respond to avoid the global catastrophe that climate change could bring? Climate ethics (CE) can therefore be defined as the moral aspects of climate change to deal with the climate crisis. The climate crisis is not only an environmental problem, but also an economic, social, ecologic, and political issue that needs to develop an ethical point of view (Akkuş, 2021). Considering that climate change is an ethical issue, it would also be unethical to ignore its global impacts (Bazzul, 2020). Unless we appraise ethics in education and our ethics depend on the eco-centric notion, humans will face mass extinction because of catastrophic climate change in the future (Verharen, 2020). From this point of view, science education and environmental education for SJ is a political choice (Hansson & Yacoubian, 2020). Pedersen (2021) argued that the anthropogenic infrastructure of education is becoming outdated in the time of mass extinction due to anthropogenic climate change. In From the SJ perspective, the political choice of teaching climate change would be the emphasizing that climate change is the most significant current SJ issue. While CE focuses on the effects of climate change caused by human activities and how to address them justly, SJ aims to ensure social equality and justice by considering economic, social, and cultural differences (Sterling, 2001). Within sustainable education, these concepts provide students with the ability to understand and address not only environmental issues but also how these issues affect justice and equality among people (UNESCO, 2017).

From an SJ perspective, climate justice (CJ) links climate change to social, political and environmental issues, emphasising the disproportionate impact of climate change on vulnerable communities who are least responsible for the problem. Environmental and climate vulnerability are not only indicators of social injustice, but also include the non-human environment. This vulnerability generates both social injustice and ecological damage. Therefore, CJ movements depend on the principles of SJ, democratic accountability and participation, and ecological sustainability (Schlosberg & Collins, 2014). Jorgenson et al. (2019) recommended that educators move beyond pro-environmental behaviour and reconceptualize children as innovators and agents of change within a broader social network. They also argued the requirement of teachers' focus on narratives and guiding visions to support students' participation in collective action. From this point of view, teachers play a key role in cultivating such an interaction between schools, scientists, activists, society, and institutions about socioscientific issues in general and specifically climate change. Teachers in today's climate crisis, therefore, should learn how to frame climate change education to foster participation in collective action. To achieve this aim, new approaches to framing climate change education are necessary.

Eaton and Day (2020) criticized the function of environmental education because of being assimilated by neoliberalism and serving fossil fuel companies and obstructing public CJ

education. They also argued that the role of today's schools is producing job-ready workers and the emphasis on scientific literacy and science-technology-society could not serve to reproduce social relations and cope with climate crises. They also stressed the necessity of a transformative pedagogy to challenge the corporate power of industries aiming at the transition of a post-carbon economy. However, there is no consensus in the environmental education literature on how to implement transformative pedagogy to achieve this transition.

Contemporary research on environmental education focuses on education for sustainability and points to the need for continuous empirical experimentation and validation of new teaching approaches in a step-by-step process to transform existing systems from within (Wamsler, 2020). Considering the need of targeting non-anthropocentric ethics in environmental education (Kopnina, 2020), the paper presented here is an attempt to meet this need by empirically investigating pre-service teachers' (PSTs) ethical reasoning about two different ethical approaches, namely CE and CJ, to transform existing environmental education systems. Ajaps (2023) emphasized the ecocentric focus for the pedagogy and practice of environmental sustainability in higher education in order to achieve social justice.

Stapleton (2017) stressed the importance of framing climate change education around SJ. She addressed climate justice (CJ) as a social movement that uses SJ to frame climate change and suggested by contextualizing climate change in CJ during teaching not only science, but also social studies and humanities to nurture the interdisciplinary connections and perspectives. According to Novak (2000), SJ is a virtue that is ideologically neutral and has the characteristics of organization and cooperation of citizens to accomplish a task and goal for the benefit of others. From an SJ perspective, CJ is a term that aims to reduce marginalization, exploitation, and oppression in order to increase equity and justice by paying attention to how climate change affects people differently, unevenly, and disproportionately (Sultana, 2022). McGregor and Christie (2021) found that teachers were less informed about CJ than activists and advocacy workers. These studies point out the necessity of examining PSTs' ethical reasoning about climate change and SJ, thus CJ. However, research studies exploring such reasoning are rarely found and there is no consensus in CJ research on how such kind of education should be structured. Despite the suggestions of developing climate ethics (CE) courses on the topic of climate change and sustainability in literature (e.g., Brister, 2014), no research studies compared the benefits of teaching ethical issues about climate change in the context of CE and CJ. Therefore, it seems necessary to examine PSTs' ethical reasoning by using general or content-specific questions to promote teacher education programs regarding CJ.

CJ requires an interdisciplinary approach to environmental and sustainability education. Interdisciplinary education enables students to evaluate environmental issues from different disciplinary perspectives, thus promoting a comprehensive understanding. For example, integrating insights from disciplines such as environmental science, social science and economics enhances understanding of the origins, impacts and potential solutions to problems (Walshe, 2017). CJ is paramount as it enables teacher candidates to understand global climate change issues and provide informed education. Furthermore, interdisciplinary sustainable environmental education cultivates the ability to generate and implement more effective solutions by synthesising knowledge from different fields and transcending the limitations of a single discipline. Integrating environmental issues into foreign language teaching through activities such as writing, reading comprehension and other exercises facilitates a more holistic approach to environmental challenges.

Sustainability has significant implications for political processes and social change (Hopwood et al., 2005; Midgley and Reynolds, 2004). A key indicator of whether sustainability has been truly implemented is whether public participation has emerged institutionally to enable better democracy, burden-sharing and equity (Spangenberg, 2002). Sustainability studies show that public participation has a positive impact on governance and sustainability. Lyons et al.

(2001) argue that through participation in decision-making, individuals gain political skills and communities gain more control over their own affairs and destinies. Among the key elements of institutional imperatives is a policy dimension for interdisciplinary sustainability studies, which also provides recommendations for action. Language teachers have a key role to play in facilitating such action by encouraging their students to read and analyze sustainability texts from an interdisciplinary perspective. In light of all these perspectives, sustainable environmental education is linked to the concept of climate justice through English language education.

1.1. English Language Teaching and Sustainability Education

In a global sense, there is emphasis on raising awareness about the necessity for equal and fair access to natural resources, sharing, and conservation, without discrimination based on religion, language, or country, within a worldview that goes beyond mere ecological terms, in environmental education (UNESCO, 1997). The realization that the pursuit of economic development and welfare at the expense of the environment is unsustainable and will result in more severe consequences for human well-being and the economy in the long term has prompted the search for ways to achieve economic development in harmony with the environment.

The growing awareness among young climate activists who demands that future generations take a stand for sustainability and climate justice highlights the necessity for the education system to be restructured in order to produce more conscious individuals. It can be argued that education plays a pivotal role in initiating the desired change towards a safe, fair, and sustainable environmental understanding. This is evidenced by the assertion that the integration of sustainable environmental values into "all aspects of education" (UNESCO, 2005) is essential for the achievement of this goal.

It is imperative that the fundamental principles and values associated with sustainability are integrated into the education process. These values include addressing both local and global needs, and focusing on techniques that integrate the relationship between society, the environment, and the economy into the teaching process, particularly in teacher education programs (Turhan, 2012). This integration necessitates an examination of PSTs' reasoning about environmental and sustainability issues, with the objective of identifying the necessity for environmental eduction to be emphasized in teacher training.

Turkey's education programs have also responded to these needs by integrating them into the curriculum from pre-school to secondary education levels. In addition, in-service training for teachers has been provided, and renewal efforts in the education process have been initiated through practices such as eco-schools. Since 1992, the subject of the environment has been included in science curricula, as well as in social studies, geography, and life sciences. This began with elective courses under the title of Environment and Human, which were later integrated into the Biology and Geography curricula. Nevertheless, it has been observed that the curricula in question lack sufficient consideration of the economic and social justice dimensions within the sustainability framework (Kaya & Tomal, 2011; Tanrıverdi, 2009; Yapıcı, 2003).

In order to develop education and teaching processes that adhere to international standards for achieving sustainable development, it is necessary to adopt an interdisciplinary approach (Demirezen & Kaya, 2022). However, one of the fundamental problems in Turkish curricula is the lack of an interdisciplinary approach (Karakuş & Şeyihoğlu, 2021) that enables active participation, critical and analytical questioning in environmental issues. The objective of the current study is to integrate an interdisciplinary approach to PSTs' reasoning about climate change and sustainability issues by relating these issues to ethics in a course taught in the ELT department.

English is the language of the 21st century and it can be employed as a means of challenging contemporary worldviews (Bowden, 2010; Zygmunt, 2016). Therefore, English language

teaching (ELT) programs in the teaching of teaching sustainability. In order to adapt in 21st century there is an urgent need to transform traditional educational systems into more effective educational systems (Bekteshi & Xhaferi, 2020). This transformation also includes the promotion of ELT programs to include ethical issues of climate change as well as sustainability.

For over a decade, there has been a growing movement in education to address the concepts of sustainability across the curriculum. English language classes are thus an ideal starting point for reading, writing, and discussing global issues. A holistic view of English education through the lens of sustainability is in line with the changing world in which we live. Furthermore, teaching sustainability solely as a concept leads to an interdisciplinary approach that includes ecological, social, and economic contexts (Wright & Wright, 2010).

The efficacy of instructing students in higher education (HE) about sustainability issues in English classes is contingent upon the specific topics under consideration and the students' predispositions towards learning about these topics (Bekteshi & Xhaferi, 2020). Consequently, it is essential to investigate the evaluation of sustainability issues from an interdisciplinary perspective among pre-service English language teachers. Despite the extensive literature on interdisciplinary approaches, there has been relatively little research on how teachers and students cope with and respond to this central aspect of sustainability education (Feng, 2012).

From an interdisciplinary perspective, all parties including teachers, students, local communities, environmentalists, and policymakers should participate in the solution of environmental problems and the enabling of sustainability on our planet. Therefore, it is necessary to equip ELT students with the ability to integrate environmental issues in language education (Nur et al., 2022). However, most pre-service English language teachers receive no training on sustainability issues (Fındık et al., 2021). To this end, it is vital to investigate the evaluation of these issues by pre-service English language teachers in order to inform the development of sustainability education courses within teacher training programs.

1.2. Teaching Climate Ethics and Climate Justice

Climate change is strongly emphasized in formal education and educational programs also include environmental ethics. However, environmental education is given from anthropocentric, rather than biocentric ethics. Climate change and CE education should adopt an ecocentric perspective, which includes care for the common good and justice (Gola, 2017).

Climate change has been increasingly considered an SJ issue among academicians, policymakers and the public; however, it has newly been empirically studied considering its implications for cooperation and decision-making (Pearson et al., 2021). Rousell and Cutter-Mackenzie-Knowles (2020) stressed the requirement of developing new approaches to climate change education that directly engages the next generation in dealing with scientific, social, ethical, and political aspects of climate change in a transdisciplinary approach. Examining learners' evaluation of ethical issues about climate change will allow educators to develop new approaches to climate change teaching. Brister (2014) suggested developing a CE course on the topic of climate change and sustainability by examining cases about food consumption, transportation choices, and energy use as well as connecting these issues to policy actions. On the other hand. Furthermore, Svarstad (2021) argued that the students should also examine and discuss the options for decreasing greenhouse emissions considering CJ in their own countries. However, the argument of this paper is that it is also necessary to decide on using the methods and tools to teach ethical issues regarding climate change in K12.

Armitage (2018) suggested implementing ethics programs including discussions of ethics-related issues. On the other hand, stories in general (Lloyd & van de Poel, 2008) and digital stories (Malandrakis et al., 2019; Otto, 2017), games (Upegui et al., 2021) and online and video games (Ouariachi et al., 2018; Wu & Lee, 2015) have been used to teach climate change. However, there

is a lack of research investigating the effectiveness of PSTs' implementation of these methods and tools to teach ethical issues of climate change. Teachers have the responsibility to teach not only knowledge, but also ethical aspects of climate change (Reid, 2019). In order to achieve such a pedagogical goal, it is necessary to explore PSTs' reasoning on the topic of CE and CJ. However, it is necessary to decide whether to ask PSTs to discuss predetermined ethical aspects, i.e. in a structured way, or to give PSTs the autonomy to decide on their own ethical considerations, i.e. in an unstructured way. This decision requires an exploration of PSTs' reasoning about climate change in both situations. Such exploration may bring new insight into constructing ethical courses in a structured or unstructured way. Higher education institutions play a crucial role in promoting sustainability and sustainable development. Therefore, universities are developing sustainability curricula to increase awareness (Tasdemir & Gazo, 2020). Annan-Diab and Molinary (2017) emphasized the importance of integrating sustainable development and ethics into the curriculum and adopting an interdisciplinary approach to education. This interdisciplinary approach helps students develop the key competencies necessary for sustainable development. Sustainability education requires the integration of knowledge and methods from various fields, including environmental sciences, economics, sociology, and education (Barth et al., 2007). In this context, the concepts of CE and SJ become fundamental pillars of sustainable education. They help students to act consciously and effectively towards creating a fairer and more sustainable world for future generations. The current paper argues that language teaching provides an excellent opportunity for sustainable education by bringing knowledge from various fields when reading texts.

Integrating the goals of environmental ethics and climate change into various disciplines, including foreign language education, will strengthen interdisciplinary connections and promote a holistic understanding of sustainability issues among students (Gardiner, 2006). Therefore, teaching foreign languages with a focus on climate change not only enhances students' language skills but also encourages critical engagement with environmental challenges and potential solutions. Teaching English through the lens of sustainability empowers pre-service teachers with the confidence and knowledge of best practices, supporting an ethical stance that emphasizes the socially humane objective of teaching children (Wright & Wright, 2010). Integrating sustainability concepts into English language education through an interdisciplinary approach provides students with the opportunity to consider the interconnectedness of environmental, social, and economic systems, thereby fostering a more nuanced understanding of global issues. Brown (2024) demonstrated the value of hidden curriculum in ELT to promote critical thinking and sustainability. Therefore, it is important to PSTs' ethical reasoning of sustainability issues through an ethical lens for the further development of English language curriculum and English language teacher education programs.

1.3. Purpose

Zeidler et al. (2014) stressed the need of for reflective judgment through socio-scientific issues for the promotion of moral reasoning. We argue that PSTs' reflection on climate change by discussing its ethical aspects will shed light in on deciding how to teach the ethical considerations of climate change. The current study therefore examined PSTs' ethical reasoning using two different themes to reflect their reasoning: (1) Climate ethics and (2) Climate justice. Reasoning was considered in two parts including evaluation and teaching designs of CE and CJ in the current study. Comparison of the levels of PSTs' evaluation and teaching in each title provides new insight into teacher education programs in terms of ethical issues of climate change. The present study addressed the following research questions:

- Is there a significant difference between the levels of PSTs' ethical reasoning regarding climate change and social justice?
- Is there a significant difference between the levels of PSTs' evaluation of climate ethics and climate justice?

- Is there a significant difference between the levels of PSTs' teaching designs of climate ethics by a method they chose and CJ by a predetermined method?

METHOD

2.1. Participants

The study employed purposeful sampling, specifically convenience sampling, to select participants. This method was chosen for its time and cost efficiency, as well as its ease of access to participants (Creswell, 2018). Thirty-one pre-service teachers (10 males, 21 females) who study in the ELT Program at the Faculty of Education at a private university in Turkey participated in the study. One of the students was from Lebanon, one of them was from Libya, one of them was from Japan, and one of them was bilingual (half-British, half-Turkish). The students from other countries, who came to the university through exchange programs, followed the same procedure as the Turkish students. The rest of the participants were Turkish. The study utilized document analysis to collect written reflections from participants for data analysis, saving time and expense compared to transcribing. This method allows researchers to access the data at any time (Creswell, 2018).

In Turkey, students need to attend to university entrance exam to be placed in a department of a university. All candidates who wish to enter university must take the first stage exam called the Basic Knowledge Test (Temel Yeterlilik Testi - TYT). Students who wish to enter foreign language departments in their university elections must take the foreign language exam called Foreign Language Test (Yabancı Dil Testi - YDT) after the TYT exam. While the YDT is an exam that measures language proficiency completely, the TYT exam includes Turkish (40), Mathematics (40), Social Sciences (25) and Natural Sciences (20) questions. While foreign language students are required to score at least 0.5 net in Turkish or mathematics in the TYT exam, there is no such requirement for science questions. Furthermore, if we look at the curricula of primary and secondary education, we can see that the science-related subjects of the students of the respective department are only included in one subject, i.e., alternative energy, in the curricula of secondary education (OSYM, 2023). Looking at the university education process, it can be seen that the students of the language department do not take any course related to science. Although they never have never taken an environmental education course at university, they are responsible for teaching environmental topics. Language education in Turkey starts from the 2nd grade and continues until the 12th grade. Since climate change is an interdisciplinary field, climate change and topic of the environment are also included in English lessons, especially in reading texts.

Table 1

Topics about Environmental Issues Covered in English Language Curriculum

Grade	Topic
6th	Saving Planet – What should we do to save our world?
7th	Environment – What should we do for our environment?
8th	Natural Forces
11th	Values and Norms
12th	Human Rights Alternative energy

Table 1 illustrates the topics about environmental issues and values and norms, such as human rights that the English language curriculum program in Turkey covers between the grades of 6-12 (MEB, 2018a; MEB, 2018b).

2.2 Procedure

The data was collected in the course 'Ethics & Morality in Education', where PSTs' discussed various ethical and moral issues and dilemmas in general and in education in particular, and how to deal with them in their teaching. The course started with a discussion on ethics in education and how to integrate ethical discussions into education based on the moral development of children aged 3 to 15. In the upcoming weeks, various models of ethics education will be presented. These include critical thinking, philosophy with children, Socratic dialogue, the values clarification process, the use of ethical dilemmas, stories and games, the values and development square, ethical decision making, and social justice (Table 2).

Table 2

The Flow of the Course

Week	Topic
1	Ethics in education
2	Integration of ethical discussions in education
3	Critical thinking approach to teach ethics in education
4	Philosophy with children
5	Socratic dialogue
6	The values clarification process
7	Using ethical dilemmas in ethics education
8	Using stories in ethics education
9	Using games in ethics education
10	The value and development square
11	Ethical decision making and social justice
12	Reflection on CE and CJ

The course uses climate change as a context for teaching ethics. In the final week, participants learned about CE and CJ concepts. The PSTs were introduced to the general problems caused by climate change and why it is an ethical issue. They were then asked to reflect on their thoughts about these concepts and how to teach them. The data was collected through participant reflections at the end of the course, after they had gained a thorough understanding of ethics and different approaches to teaching ethics.

To investigate the participants' ethical reasoning of climate ethics and social justice regarding climate change, this study explored PSTs' ethical reasoning through two different reflections. In the 1st reflection, with a CE approach, they were asked to discuss ethical issues about climate change and design an instruction to teach these ethical issues by a method they chose. In the 2nd reflection, with a CJ approach, they were asked to discuss SJ by relating this issue to climate change and create or use a story, and then design a game based on this story to teach CJ. The PSTs were introduced to the concepts of CE and CJ in the course before submitting their reflections. The current study explored PSTs' reasoning on CE without clearly identifying the ethical aspects of climate change and by giving the PSTs the autonomy to identify the ethical aspects. On the other hand, the PSTs were introduced to the concept of CJ and discussed this concept with a predetermined criteria of SJ principles. Table 3 illustrates the 1st and 2nd reflection questions to assess PSTs' ethical reasoning.

Table 3

PSTs' Ethical Reasoning in the 1st and 2nd Reflection Forms

	CE (1st reflection)	CJ (2nd reflection)
Identification	1. Which actions or choices do you think contribute to climate change? Discuss the ethical issues about these actions and choices. 2. Which one(s) of them would you agree to give up? 3. Which one(s) of them would you refuse to give up?	1. What do you think social justice means and what can be the dangers of a world indifferent to justice? 2. Do you think there is a relationship between social justice and climate change? 3. Do you think your actions and choices contribute to creating social justice? If so, how? If not, what should you do to create justice in society?
Justification	Explanations of the reasons for the three questions listed above.	Explanations of the reasons for the three questions listed above.
Teaching	4. Identify an ethical issue related to climate change and design an instruction to teach this ethical value. 5. Explain the procedure of your teaching step by step.	4. Create a story and design a game on this story to teach social justice considering climate change in your class. 5. Explain the procedure of your teaching step by step.

As shown in Table 3, first, PSTs identified and justified ethical issues regarding climate change and then designed an instruction to teach an ethical issue. The authors did not address any specific method in the 1st reflection. Then the participants were asked to teach an ethical issue about climate change. In the 1st reflection, the authors did not specify any of these ethical issues. The PSTs were free to choose one of these issues. Contrary to the 1st reflection, in the 2nd reflection the authors asked PSTs to specifically address SJ and design their teaching of CJ by using a story and game.

The authors compared the level of reasoning in each reflection to determine whether framing ethical issues of climate change as CE or CJ affects the perspective of designing environmental education tasks. This comparison will expand our understanding of how to design environmental education tasks, specifically addressing ethical aspects of climate change and prompting pre-service teachers (PSTs) to discuss these issues. Additionally, the study will explore PSTs' autonomy in making ethical considerations. The study's findings will provide insight into whether teacher education courses should require pre-service teachers (PSTs) to design their teaching based on a specific method or allow them to choose their own.

Ethical permission was received for this research from Istanbul Aydin University Educational Sciences Ethics Committee (date: 28.02.2022 / approval number: 45379966-020-42646). Additionally, details of study participants (names, dates of birth, ID numbers and other information) are not published in written descriptions, photographs and genetic profiles.

2.3 Analysis of Data

The authors of the current study created a rubric to analyze the participants' reflections and coded their explanations as high, moderate, and low level of reasoning, then scored each level of reasoning as 3, 2, and 1, respectively for the statistical analysis of the comparison of the scores in each reflection. They calculated the PSTs' total scores in each category (identification, justification, and teaching) in each reflection (CE and CJ) for the statistical analysis. The total scores of each category in each reflection were compared by using t-test.

Table 4 indicates the rubric and examples of responses in the categories of identification, justification, and teaching for each of the reflections. Expert judgment was received during

creating the questions in reflection forms. A researcher who works on ethics and another researcher in science education whose research interest is environmental education checked and gave feedback to finalize the questions in the reflection forms.

Table 4

Rubric to Assess PSTs' Reasoning

	High	**Moderate**	**Low**
Identification	The PST successfully identified CE/CJ issues with a critical and holistic perspective.	The PST successfully identified CE/CJ issues but without elaborating on information or discussing the interrelationship between different aspects.	It is hard to understand why the topic that the PST chose is an ethical issue.
Justification	The PST justified his/her position by constructing evidence-based arguments.	The PST clearly stated his/her position but there is not enough evidence to support his/her arguments.	It is hard to understand why the PST adopted this point of view.
Teaching	The PST planned and organized the activities clearly to enable the learners actively engage in the activity and adopt the required value about this topic.	The activities that the PST created seemed to be unorganized to allow the learners actively engage in the activity and adopt the required value about this topic.	The activities that the PST created seemed to fail to allow the learners actively engage in the activity and adopt the required value about this topic.

To ensure the content validity of the reflection papers, the researchers analyzed the questions on the reflection papers to determine whether they included the questions needed to evaluate ethical considerations related to climate change and whether they would facilitate the development of a curriculum on the ethical aspects of climate change.

The authors of this study analyzed the PSTs' responses in each form independently to ensure the internal consistency reliability of the analysis. The initial agreement between their coding was 76%. They discussed their conflicts until they reach a full consensus on their coding. The authors also created categories of ethical issues that the PSTs' teaching designs independently. They also discussed these categories until they reach a complete agreement on the categories. After they decided on the categories of ethical issues, they again coded the PSTs' designs. They completely agreed with their coding in their first analysis.

FINDINGS

The authors analyzed the participants' explanations in two subsections including the ethical evaluation of CE and CJ and teaching designs of ethical issues. Subsequent sections present both the statistical and qualitative analysis of the PSTs' ethical reasoning of climate ethics and social justice related to climate change. To identify the statistical analysis of the scores in each category, the authors applied the Kolmogorov-Smirnov test, goodness of fitness test in the scores. This test indicated that the distribution of neither of the categories in the 1st and 2nd reflection was normal ($p<0.05$). Therefore, the Wilcoxon Signed Ranks test was utilized in each of the categories in the scores of each reflection.

3.1 Ethical Evaluation of Climate Ethics and Climate Justice

The authors again statistically analyzed the participants' scores of each reflection to investigate whether there was a significant difference between their level of identification and justification in CE and CJ. This investigation will bring new light into teacher education programs considering the task designs that probe reasoning about ethical issues of climate change.

The findings of the Wilcoxon Signed Ranks test of the scores in the categories of identification and justification indicated that the PSTs outperformed in the 2nd reflection than they did in the 1st reflection as shown in Table 5. Table 5 reveals a significant difference between the PSTs' scores of reflections in each reflection. It is evident from this result that the PSTs identified and justified SJ by relating it to climate change much better than they identified and justified an ethical issue regarding climate change.

Table 5

The Results of Identification and Justification of Climate Ethics and Social Justice

	Identification 2 – Identification 1	Justification 2 – Justification 1
Z	-2.985b	-2.874b
Asymp. Sig. (2-tailed)	0.003	0.004

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks

One can infer from this finding that it seems more beneficial to specifically address ethical aspects of climate change and to ask PSTs to discuss these issues, rather than giving them autonomy to decide on their own ethical considerations. Table 4 illustrates the participants' quotations as examples in each level of each category in CE reflections, while Table 4 indicates the examples of their reasoning in each level of each category in CJ reflections. Table 6 and Table 7 include the categories of identification and justification.

The teaching category will be presented in another section because these categories emerged from the PSTs' reflections on the 1st, 2nd and 3rd questions, while the 4th and 5th questions involved the participants' reasoning about teaching. As an example of high reasoning during identifying and justifying the ethical issues of climate change, P5 (participant 5) identified that the choice of public transportation is ethical because of the carbon emission of fossil fuels into the atmosphere issue.

S/he also critically discussed the influence of the social and political context by providing evidence of the Netherlands and Istanbul cases to decide on the use of transportation and by pointing out the moral dilemma that the people face about this issue. S/he seems to have been aware of the necessity of a collective solution rather than taking individual actions to solve the problems. P4 has moderate reasoning during identifying ethical issues of climate change, especially during emphasizing the choice of public transportation. S/he addressed the harmful gasses released from vehicles without further elaboration on changing habits. S/he did not discuss what to do to overcome this problem. S/he also stressed that every individual on Earth has a responsibility to deal with climate change.

However, s/he did not elaborate on this idea by explaining how. His/Her justification, on the other hand, is at a low-level because s/he did not clarify what and why further research is needed. S/he neither talked nor justified his/her views about transportation or other issues s/he mentioned earlier. Another example, P7 listed many actions that cause climate change. However, it was not clear why s/he thought of these actions as ethical issues. However, s/he justified his/her position. S/he also pointed out the harms of overconsumption of meat and the necessity of

changing our habits in our diet. Yet, s/he did not provide evidence for his/her claims. His/Her explanation was coded as moderate level of reasoning because of lacking evidence. P2 defined the term CJ clearly and briefly by explaining his/her position about the usage of plastics and energy policies. His/ Her explanation is an example of high reasoning as s/he critically discussed how the consequences of climate change create inequality and injustice in society.

Table 6

Examples of PSTs' Reasoning in CE Reflection

	High	Moderate	Low
Identification	I think there are so many actions and choices to make about this issue. For example, public transportation is an important choice regarding climate change. We need to use public transportation to eliminate carbon dioxide emissions (P5).	Everyone is responsible for climate change because as humans, we have the biggest role in climate change. The actions of humankind have led to climate change. Human actions have a key role in this problem and every individual is responsible for their part. Some of my actions may be a reason for climate change. …Every vehicle I use had a huge contribution to climate change. There are harmful gasses that can be produced by many resources and vehicles are one of them (P4).	There are many advantages of taking action on climate change, such as eating less meat and dairy, flying and driving less frequently, lessening your energy use, and bills, respecting and protecting green areas, cutting consumption- and waste, talking about the changes you make, etc. (P7).
Justification	Unfortunately, it is still a position that we cannot fully prevent as an individual. Because even the actions I have mentioned above are not just up to me. In some places like the Netherlands, they made it possible for society to use bicycles for transportation. However, in crowded cities like Istanbul it is almost impossible to travel by bicycle, even using public transportation regularly is hard." So, people have to use their cars for transportation even if society is informed about the damage they do to the environment. This is a "Moral Dilemma" and solving this problem needs social and political actions (P5).	I would agree to give up on eating less meat and dairy. Because decreasing the consumption of meat and dairy products is one of the biggest ways to reduce greenhouse emissions. We shout eat less or less meat, especially red meat because it has the greatest impact on the environment and decreases the consumption of dairy products or replaces them with non-dairy products. We also should try to choose locally grown fresh seasonal agricultural products to help reduce carbon emissions during transportation, storage, and long-term cold storage. …Changing habits in our diet can help significantly to reduce our greenhouse gas emissions (P7).	In my opinion, we need further research to have better options for our world. As long as people decide on saving our planet, we can always find better solutions. (P4).

Similarly, P23 critically reflected a high level of reasoning during explaining and justifying why climate change is an SJ issue. S/he pointed out the injustice of creating the causes and facing the consequences of climate change in different social groups by citing leading researchers in the

field and identified and discussed the significance of public engagement in making decisions to deal with SJ issues.

As an example of a moderate level of identification, P15 clearly defined SJ and identified the principles of SJ but with a lack of elaboration on these principles. S/he did not indicate the connection between SJ and climate change by discussing the causes and consequences of climate change based on injustice or provide evidence for his/her claims.

P10 also reasoned at a moderate level during justifying that climate change is an SJ issue. S/he justified his/her opinion by giving examples of different regions but without providing evidence for his/her claims. S/he did not elaborate on information or discuss the interrelationship between different aspects of SJ either. P29 revealed low reasoning both during identifying and justifying the ethical aspects of climate change.

Table 7

Examples of PSTs' Reasoning in CJ Reflection

	High	**Moderate**	**Low**
Identification	Climate justice is a concept and a movement, that recognizes various social and economic impacts of climate change especially on disadvantaged communities. Climate justice advocates are working to confront these injustices head-on through long-term mitigation and adaptation initiatives. …To sum up, climate change, in my opinion, has a strong link to social justice since it threatens everyone's health, and their access to shelter, food, clean air and water, but socially and economically disadvantaged groups are especially vulnerable (P2).	Social justice is one of the most effective factors for every living thing on earth to be in a society where they have equal rights and live in peace. It is an effort to ensure that every human being has equal rights regardless of rich, poor, developed, undeveloped or gender. This ideology prevents crises in the world by creating social awareness. In this regard, we can call the principles of social justice Equity, Rights, Access and Participation (P15).	Social justice means that people are living with commonality. Social justice provides equality to people. It has the principles of rights, freedom and equality. (P29)
Justification	If we go back to the point where climate change meets social justice; I can start by exemplifying the fact that although carbon is emitted at different rates in different countries, people around the world are unfairly exposed to it.…. So, in climate injustice, according to the analysis of Professor William Nordhaus, winner of the 2018 Nobel Prize in Economics, even if the developed countries cause it, the developing Southern countries are paying the cost of climate change 78% of the time. Although the single vote I gave was a very small contribution, we can change the person who will lead us with the vote of everyone who can do it in Turkey. And maybe if everyone in the world gets the right education, we can take away the power of the people who are causing this inequality in the world (P23)	Climate change is not only an environmental problem but also a justice problem. For example, in the United States, Latino and black Americans reside in areas that are riskier in toxic waste, and they live close to regions where air pollution is high (P10).	I think that there is a connection between social justice and climate change. Because climate change occurs due to most people's wrongful acts. Social justice requires punishing people who harm the environment (P29).

S/he superficially defined SJ without explaining why it is an ethical issue regarding climate change. S/he also listed some of the principles of SJ without making any connection to climate

change. All of his/her explanations lacked justification. It is also interesting to note that s/he saw SJ as punishing those who harm the environment, but did not justify how this punishment helps to create SJ around the world.

3.2 Teaching Designs of Ethical Issues

The authors again statistically analyzed the participants' scores of each reflection to explore whether there was a significant difference between their level of teaching designs in CE and CJ. This exploration will guide the educators to decide whether a specific or a general approach to teaching design is necessary regarding ethical issues of climate change.

The results of the Wilcoxon Signed Ranks test of the scores in the teaching category again revealed a significant difference between the PSTs' teaching designs in each reflection as illustrated in Table 8. As shown in Table 6, the PSTs planned and organized the activities more clearly to enable the learners actively engage in the activity and adopt the required value on the topic of social justice by using stories and games than they did on an ethical issue they freely chose about climate change by using a method they determined.

Table 8

The Results of Teaching of Climate Ethics and Social Justice

	Teaching 2 – Teaching 1
Z	-2.097b
Asymp. Sig. (2-tailed)	0.036

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks

This finding suggests the need of framing the ethical issues of climate change around a structured topic, namely social justice as well as asking PSTs to teach social justice by using a predetermined method, such as stories and games. The following quotations are presented as examples of teaching designs of CE at different levels:

> In my opinion, climate change and many other values such as this should be given to young children at a young age by methods that will help them think critically, rather than the classical teacher-centred education method…. At this point, empathy and respect for the feelings and thoughts of others are very important. When we come to the acquisition of an ethics consideration, the student must answer the questions of "what is the real good or bad, true or false and why?" of his or her current knowledge about climate change…. I think it will be effective to have a debate among students to make this happen. While debating, the student realizes how defensible the opinion that he is completely against, in addition to defending his own opinion (High level of teaching – P24).

> We can find photos of the barren lands taken from movies, games and illustrations and show them to students and ask them what could have caused the world to become like this. What choices of people can affect the world this much? Following the views that the students share, we could tell them that the reason climate change is people's irresponsible behaviours and ask them to come up with solutions. Based on the solutions we can recreate a new world for them by painting or we could find photos (Moderate level of teaching – P21).

> First, we should instil environmental awareness in people, for example, we should organize presentations that will attract people's attention, or we should talk about worries we have about the world. We can ask what will happen to Earth if we do not

> take the necessary precautions. In addition, we should make speeches that can guide people's thoughts to increase their level of consciousness of the environment and climate change. Because raising awareness in people, people start to think about their future and the future of their children, and they become more selfless and understanding for a better future, which shows that we can be united in protecting the environment (Low level of teaching – P15).

These quotations indicate a superficial explanation of the teaching strategies of CE. Even if the participants emphasized effective methods, such as debate to teach various ethical values, they seem to have been challenged to present a coherent representation of the method they suggest (P21). On the other hand, some of the participants did not clearly explain how to enable their students to adopt these values (P21) or even did not specify the ethical values to teach (P15). The PSTs' teaching designs about CJ seem more coherent and detailed even at the same level of teaching. The following example of the story P13 told was a high level of teaching regarding CJ. S/he started his/her story with a student who visited a science museum with his/her teacher and his/her classmates and the students' concern about some animals' destroying their habitat because of climate change:

> Polar bears and penguins attracted Brenda's attention the most because the area they were in at the zoo was not like their natural habitat. Brenda realized that these animals, which normally live in the polar regions, on the glaciers, are not at all happy where they are in the zoo. The teacher gave Brenda some information about climate change. She stated that unless the problem of climate change is resolved, all glaciers will melt and the glaciers inhabited by polar bears will disappear... She told her teacher that she wanted to be a scientist to find a solution to climate change.

Following the story, P13 designed a board game including various characters in different social classes (e.g., businessman, deputy, farmer, employee, etc.). In this game, s/he asked the players to take different roles and list the actions they would take to protect the lives of all people and living things on Earth and deal with injustice on Earth. His/her story and game provide evidence to his/her reasoning about climate change as an SJ issue considering not only humans but also all living things on Earth. Some of the participants designed teaching both including a story about SJ and designed a game based on the story but seemed to have been challenged to connect it to the climate change issue. For instance, P19 presented the following peer bullying story and designed a monopoly game to deal with bullying:

> Ahmed would be a young Muslim boy who is trying to prepare for his college exams and must work at the same time to help his family. David is also in the same class as Ahmet. Different from Ahmet, David is lazier and ruder to people around him, but his life is easy thanks connections and wealth of his family. David has no empathy and bullies Ahmed in the school because of his different sociocultural background. One day Ahmet and David's teacher asked them to play monopoly. What kinds of rules do you think the teacher should put to avoid David bullying Ahmed?

One of the participants (P29) designed a teaching matching activity about SJ but did not present any story. S/he neither provides any guidance to engage students in the activity nor adopts the SJ value. The results provide evidence that asking PSTs to identify and justify a specific ethical issue, namely CJ rather than putting it in a general way as CE is more effective to elicit PSTs' reasoning skills. The findings also indicate the benefits of asking PSTs to design teaching on CJ instead of CE. The PSTs might have been challenged to organize their understanding of ethical aspects of climate change to identify, justify and design teaching on these issues. On the contrary, SJ seems to have provided a framework to organize their thoughts and reflect them in a more focused manner. From this perspective, it seems necessary to restructure environmental education courses in order to frame ethical questions about SJ in a structured way, rather than in

an unstructured way in which PSTs decide on their own ethical considerations about climate change.

DISCUSSION & CONCLUSION

Incorporating sustainable environmental education with an interdisciplinary perspective has significant contributions to raising awareness, especially about climate justice and global climate issues (Walshe, 2017). The current study addressed pre-service language teachers' ethical reasoning about climate change, as they will be responsible for having their students read and analyze sustainability texts with an interdisciplinary approach. This interdisciplinary perspective allows them to help their students adopt a sustainability perspective with a justice-based understanding.

Misiaszek and Rodrigues (2023) argued that continuously reconstructing higher education for justice-based environmental education is crucial to avoid unsustainable environmental violence. The study presented here is one of the first attempts to reconstruct teacher education for justice-based environmental education. Lupinacci (2020) proposed utilizing an ecocritical framework in teacher education to engage in critical and ethical explorations of how to create and support healthy communities within an ecological system in relation to education for sustainability. To this end, the current study began with the following critical question: *What kind of framing facilitates PSTs' reasoning about ethical issues of climate change?*

The results of the current study highlighted revisiting climate change education in teacher training by framing the courses about ethics and climate change on SJ. Such kind of framing provides teacher candidates to reflect their reasoning in a more organized and coherent way in favour of CJ. In other words, it seems to be more effective to design environmental education courses in a structured way, i.e. specifically addressing ethical aspects of climate change and asking PSTs to discuss these issues, rather than an unstructured way of design in which PSTs are given autonomy to decide on their own ethical considerations.

The findings of this study support the argument that a transformative pedagogy reframing climate change education on CJ is needed to prepare students for finding solutions to today's climate crisis (Stapleton, 2017). This study reported the effectiveness of task designs on CJ on pre-service English Language teachers' reasoning about ethical issues of climate change. Similarly, Fine and Love-Nichols (2021) suggested that sociolinguists have the opportunity and responsibility of understanding and enact climate change. Further research examining undergraduate students in the sociolinguistic department may bring new light to constructing educational programs regarding CJ.

The findings of the present study also suggested asking PSTs to design their teaching on a specific method instead of letting them choose their teaching method. The participants of this study preferred to draw a general outline of their teaching strategy rather than explain their procedure when they were free to choose their methods. On the contrary, they specifically told a story and created a game based on their stories when they were asked to do so. This result suggests the necessity of asking PSTs to design their teaching on specific methods and tools to teach CJ. Encouraging students to create their activities increase their creativity and critical thinking skills (Cook et al., 2022). However, the results of the current study indicated the necessity of guidance during pre-service teachers create their teaching. This guidance in this study was the naming of the ethical issue about climate change as CJ and determining the method as story and game. Further research investigating the effectiveness of other methods that PSTs designed for their teaching of CJ may broaden our perspectives in terms of reframing climate change education in undergraduate teaching.

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GENİŞLETİLMİŞ ÖZ

Giriş

Küresel iklim değişikliği muhtemelen günümüz dünyasının en önemli meselesidir. Yine de pek çok insan bilimsel fikir birliğini reddederek bunu bir aldatmaca, aldatmaca veya sahtekarlık olarak adlandırmaktadır. İklim değişikliği inkârının sorunu, bilimsel bilgi eksikliğinden ziyade bilimin iletişiminde yatmaktadır (Allchin, 2020). Bu nedenle, fen eğitimcileri genel olarak bilimi, özel olarak da iklim değişikliğini anlatmak için yeni yollar bulmalıdır.

İklim değişikliği şu soruları gündeme getirmektedir (Broome, 2008): İnsanlar gelecek nesillerin refahını nasıl sağlamalıdır? Tüm insanlar iklim değişikliğinin aynı ağır sonuçlarını yaşayacak mı? Zengin insanlar sera gazı yayarak dünyanın yoksullarına karşı adaletsizlik mi yapıyor? İklim değişikliğinin getirebileceği küresel felaketi önlemek için nasıl tepki vermeliyiz? Bu nedenle iklim etiği, iklim kriziyle başa çıkmak için iklim değişikliğinin ahlaki yönleri olarak tanımlanabilir. İklim krizi sadece çevresel bir sorun değil, aynı zamanda etik bir bakış açısı geliştirilmesi gereken ekonomik, sosyal, ekolojik ve politik bir konudur (Akkuş, 2021). İklim değişikliğinin etik bir mesele olduğu düşünüldüğünde, küresel etkilerini görmezden gelmek de etik olmayacaktır (Bazzul, 2020). Eğitimde etiği değerlendirmezsek ve etiğimiz eko-merkezli nosyona dayanmazsa, insanlar gelecekte katastrofik iklim değişikliği nedeniyle kitlesel yok oluşla karşı karşıya kalacaktır (Verharen, 2020). Bu açıdan bakıldığında, sosyal adalet için fen eğitimi ve çevre eğitimi politik bir seçimdir (Hansson & Yacoubian, 2020). Pedersen (2021), antropojenik iklim değişikliği nedeniyle kitlesel yok oluş döneminde eğitimin antropojenik altyapısının modasının geçmekte olduğunu savunmuştur. Sosyal adalet perspektifinden bakıldığında, iklim değişikliğini öğretmenin politik tercihi, iklim değişikliğinin en önemli güncel sosyal adalet sorunu olduğunu vurgulamak olacaktır.

Sosyal adalet perspektifinden iklim adaleti, iklim değişikliğini sosyal, siyasi ve çevresel meselelerle ilişkilendirerek, iklim değişikliğinin sorundan en az sorumlu olan savunmasız

topluluklar üzerindeki orantısız etkisini vurgulamaktadır. Çevresel ve iklimsel kırılganlık sadece sosyal adaletsizliğin göstergeleri değildir, aynı zamanda insan dışı çevreyi de içerir. Bu kırılganlık hem sosyal adaletsizlik hem de ekolojik hasar yaratmaktadır.Bu nedenle, iklim adaleti hareketleri SJ, demokratik hesap verebilirlik ve katılım ile ekolojik sürdürülebilirlik ilkelerine dayanmaktadır (Schlosberg & Collins, 2014).Jorgenson ve diğerleri (2019), eğitimcilerin çevre yanlısı davranışların ötesine geçmelerini ve çocukları daha geniş bir sosyal ağ içinde yenilikçiler ve değişim ajanları olarak yeniden kavramsallaştırmalarını tavsiye etmiştir. Ayrıca, öğrencilerin kolektif eyleme katılımını desteklemek için öğretmenlerin anlatılara ve yol gösterici vizyonlara odaklanmasının gerekliliğini savunmuşlardır. Bu açıdan bakıldığında öğretmenler, genel olarak sosyobilimsel konular ve özel olarak iklim değişikliği konusunda okullar, bilim insanları, aktivistler, toplum ve kurumlar arasında böyle bir etkileşimin geliştirilmesinde kilit bir rol oynamaktadır. Dolayısıyla günümüz iklim krizinde öğretmenler, iklim değişikliği eğitimini kolektif eyleme katılımı teşvik edecek şekilde nasıl çerçeveleyeceklerini öğrenmelidir. Bu amaca ulaşmak için, iklim değişikliği eğitimini çerçevelemeye yönelik yeni yaklaşımlar gereklidir.

İnsanların küresel iklim değişikliği konusunda ne yapmaları gerektiği sorusu etik bir sorudur, çünkü bu sorunun cevabı sosyal, politik ve ekonomik unsurları göz önünde bulundurularak cevap vermeyi gerektirmektedir (Akkuş, 2021). Bu nedenle, iklim değişikliği sadece bir çevre problemi değil, aynı zamanda etik bir sorundur. Bu nedenle, geleceğin küresel vatandaşlarını yetiştirecek olan öğretmen adaylarının iklim değişikliğiyle ilgili etik muhakemelerini incelemek çok önemlidir. Bu amaçla, bu çalışmada öğretmen adaylarının iki farklı yansıtma soruları ile iklim etiği ve iklim adaleti konusundaki muhakemeleri incelenmiştir.

İklim etiği ve iklim adaleti kavramlarının öğretimi literatürde giderek artan bir oranda önerilmekle birlikte, öğretmen adaylarının bu iki kavram ile ilgili muhakemelerinin karşılaştırıldığı bir çalışmaya rastlanmamıştır. Aynı şekilde, etik konuların öğretimine yönelik hikaye ve oyunlar (Malandrakis et al., 2019; Otto, 2017; Ouariachi et al., 2018; Upegui et al., 2021; Wu & Lee, 2015) ilgili literatürde sıkça yer almasına rağmen, bunların öğretmen adaylarının kendi seçtikleri bir yöntem ve hikaye ile oyun yöntemini kullanarak tasarladıkları oyunların etkililiğini karşılaştıran çalışmalara da rastlanmamıştır. Bu çalışma, bu amaçla, literatürdeki bu boşluğu kapatmak için öğretmen adaylarının bu iki kavram temelinde iklim değişikliğini muhakeme ettikleri yansıtlamaları analiz edilmiştir.

Türkiye'de dil eğitimi 2-12. Sınıflar arasında gerçekleşmektedir. İklim değişikliği doğası itibarı ile interdisipliner bir konu olduğu için İngilizce derslerinin özellikle okuma metinlerinde yer almaktadır. İngizlizce öğretim programının 6-12. Sınıflarının öğretim programlarında gezegenimizi ve çevremizi korumak için neler yapmamız gerektiği ile ilgili değer ve normların yanı sıra, insan hakları ve alternatif enerji kaynakları ile ilgili konular Milli Eğitim Bakanlığı İngilizce öğretim programında yer alan konular arasındadır (MEB, 2018a; MEB, 2018b). Bu bağlamda, bu çalışmada ingilizce öğretmen adaylarının iklim etiği ve iklim adaleti konusundaki muhakemelerini incelemek gerekli görülmüştür.

Yöntem

Araştırmanın katılımcıları Türkiye'de özel bir üniversitenin Eğitim Fakültesi İngilizce Öğretmenliği Programında öğrenim gören 31 (10 erkek, 21 kadın) öğretmen adayıdır. Bu katılmcılardan biri Lübnanlı, biri Japon, bir diğeri ise iki dilli (yarı İngiliz, yarı Türk) öğretmen adayından oluşmaktadır. Diğer katılımcıların tamamı Türktür. Türkiye'deki üniversitelerin İngilizce Öğretmenliği Programına giren öğrenciler dil puanının yanı sıra, üniversite giriş sınavında fen bilimleriyle ilgili çok az sayıda soru cevaplamaktadırlar. Aynı şekilde, lise yıllarında da çok sınırlı sayıda fen bilimleri dersleri almışlar, üniversitede ise hiç bu dersleri almamışlardır. Katılımcıların fen ve çevre konularıyla ilgili bilgileri çok sınırlı bilgisi bulunmaktadır. Bununla birlikte, çevre ile ilgili konular İngilizce öğretim programlarında yer aldığı için öğretmeleri beklenmektedir (MEB, 2018a; MEB, 2018b).

Katılımcılar birinci yansıtmada iklim değişikliği ile ilgili etik sorunları belirleyerek iklim değişikliğiyle ilgili bu etik sorunları nasıl öğreteceklerini tartışmışlardır. Bu amaçla, öğretmen adaylarının iklim değişikliğine neden olan seçim ve eylemlerinin hangileri olduğu, bu seçim ve eylemlerinin hangisinden vazgeçip hangisinden vazgeçemeyeceklerine yönelik etik tartışmanın ardından, iklim değişikliğiyle ilgili bir etik sorun belirleyerek bunu öğrencilerine nasıl öğreteceklerini adım adım anlattıkları bir öğretim tasarlamaları istenmiştir. İkinci yansıtmada ise sosyal adaleti tartışarak bunu iklim değişikliğiyle ilişkilendirmeleri ve bir hikaye ve oyun tekniğini kullanarak iklim adaletini anlatan bir öğretim tasarlamaları istenmiştir. Bu yansıtmanın etik tartışması ise sosyal adalet kavramı merkezinde yer alarak bu kavramın iklim değişikliğiyle olan ilişkisini kurmayı içermektedir. Bu ikinci yansıtmanın öğretim aşamasında ise öğretmen adaylarından bir hikaye anlatımı ve bu hikayeye dayanan bir oyun yoluyla iklim adaleti kavramını anlatacakları bir öğretim tasarlamaları istenmiştir.

Bu yansıtmaların analizi için çalışmanın araştırmacıları bir rubrik oluşturmuşlardır. Bu rubrik, öğretmen adaylarının iklim etiği ve iklim adaleti ile ilgili etik sorunları tespit edip tartışmalarını değerlendiren tespit; bu sorunlarla ilgili duruşlarını gerekçelendirmek amacıyla sundukları kanıt temelli argümanları değerlendiren gerekçeklendirme ve bu sorunla ilgili öğrencilere gerekli değerleri kazandırıp kazandırmadıklarını değerlendiren öğretim kategorilerinden oluşmaktadır. Bu kategorilerin her biri yüksek, orta ve düşük muhakeme düzeyinde olacak şekilde kodlanmıştır.

Öğretmen adaylarının iklim etiği ve iklim adaleti yansıtmaları her iki araştırmacı tarafından bağımsız olarak her üç kategorideki muhakeme düzeylerine sırasıyla 3, 2 ve 1 puanları vererek kodlanmıştır. Araştırmacılar arasındaki görüş birliği %76 olarak belirlenmiştir. Araştırmacılar, %100 görüş birliğine varıncaya kadar kodlamaları üzerinde tartışmışlardır.

Bulgular

İki yansıtmada da katılımcıların her bir kategorideki toplam puanlarının hiçbiri normal dağılım göstermediği için yansıtmaların muhakeme düzeylerinin karşılaştırılması için Wilcoxon İşaret Sıralı test kullanılmıştır. Analiz sonuçları, katılımcların her bir kategorideki puanlarının iklim adaleti ile ilgili olan ikinci yansıtmasında, iklim etiği ile ilgili olan birinci yansıtmadakinden anlamlı olarak daha yüksek olduğunu göstermiştir. Bu sonuçtan da anlaşılacağı üzere, öğretmen adayları sosyal adaleti iklim değişikliğiyle ilişkilendirerek, iklim değişikliğiyle ilgili etik bir meseleyi tanımlayıp gerekçelendirdiklerinden çok daha iyi tanımlayıp gerekçelendirmişlerdir.

Öğretim kategorisindeki puanların Wilcoxon İşaretli Sıralar testi sonuçları, her bir yansımada öğretmen adaylarının öğretim tasarımları arasında yine anlamlı bir fark olduğunu ortaya koymuştur. Öğretmen adayları, kendi belirledikleri bir yöntemi kullanarak iklim değişikliği hakkında özgürce seçtikleri etik bir konuda yaptıklarına kıyasla, hikayeler ve oyunlar kullanarak sosyal adalet konusunda öğrencilerin etkinliğe aktif olarak katılmalarını ve gerekli değeri benimsemelerini sağlamak için etkinlikleri daha açık bir şekilde planlamış ve düzenlemişlerdir.

Tartışma, Sonuç ve Öneriler

Sonuçlar, iklim değişikliği konusundaki etik sorunları iklim adaleti çerçevesi içinde tanımlamaya (Stapleton, 2017) ve öğretmen adaylarının öğretimlerini hikayeler ve oyunlar temelinde yapılandırmanın etik muhakemeyi kolaylaştıracağına işaret etmektedir. Bu bağlamda, çalışmanın sonuçlarına dayanarak, öğretmen adaylarının etik muhakemesini arttırmak için iklim değişikliği ile ilgili etik sorunları tespit etmeleri yerine, iklim adaleti gibi belirli bir etik sorun temelinde tartışmaları önerilmektedir. Aynı şekilde, çalışmanın bulguları, öğretmen adaylarının bu etik sorunları öğretmek amacıyla kendi yöntemlerini belirlemekten ziyade, belirli bir yöntem üzerinden iklim adaleti kavramını tartışmaları etik muhakemelerini arttırmış görünmektedir. Araştırma sonuçları, öğretmen adaylarının başka yöntemler kullanarak iklim adaleti konusuna

yönelik öğretim tasarlamalarının sağlanması ve bu tasarımları inceleyen çalışmalar yapılması önermektedir. Bu araştırma, iklim değişikliği eğitimi açısından öğretmen adaylarına bu bağlamda bir rehberliğin gerekliliğine işaret etmektedir.