DOI: 10.2478/jtes-2022-0013

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Journal of Teacher Education for Sustainability,
vol. 24, no. 2, pp. 5–18, 2022

Ecocriticism Course: Development of English Pre-service Teachers' Pedagogical Content Knowledge of Sustainability

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Abstract

To address a paucity of knowledge on a way to enhance pedagogical content knowledge of sustainability (PCKS), the authors of the study developed an ecocriticism course and investigated its impact on English pre-service teachers' PCKS. A mixed-method convergent research design was employed. Forty-seven pre-service English teachers at one of the English education departments in Indonesia joined the course and received a pre- and post-questionnaire survey of PCKS. They were also required to generate English instructional ideas related to environmental sustainability at the end of the course in the open-ended questionnaire. The survey and open-ended questionnaire data were analyzed using a paired-sample t-test and content analysis. The results informed that the English pre-service teachers' PCKS, knowledge to create and provide learning opportunities for English learners to enhance the learners' sustainability capacity, was developed in the course. Accordingly, to orient English teacher education institutions towards sustainability, an ecocriticism course is suggested to integrate into the curriculum.

Keywords: ecocriticism, education for sustainable development, pedagogical content knowledge of sustainability (PCKS), language teacher education, teacher professional development

Introduction

The overarching goal of teacher education for sustainability is to train and educate them about sustainability (Ghorbani et al., 2018) so that they can disseminate the idea globally (Gopalakrishnan et al., 2019). This essential role of preparing teachers for sustainability should be started at teacher education institutions as it is the best avenue to improve their professional development and progress towards sustainability actions. Thus, reorienting teacher education to address sustainability is strongly encouraged in all teacher education fields, and English teacher education is no exception. In English

teacher education, Findik et al. (2021) inform that this reorientation can be through the presence of English language teaching (ELT)-specific courses on sustainable development (SD). They further informed that the ELT-specific courses on SD can provide essential benefits for developing English pre-service teachers' understanding and responsibility to think critically about local and global issues, language skills, and SD knowledge.

Similarly, Bekteshi and Xhaferi (2020), Amin and Greenwood (2019) inform about the possibility of reorientation in English teacher education, particularly by using the education for sustainable development (ESD) approach in ELT. The ESD integration in ELT brings vast opportunities for future teachers to improve their intellectual aspects. They highlighted that teachers of English should broaden their sustainable education vision and designs.

Those empirical grounds indicate that reorienting teacher education is possible, particularly in English teacher education. It may bring profound benefits to the development of pre-service English teachers' knowledge about SD, language skills, and critical thinking. They also have successfully informed about the ways to perform this new orientation, such as designing ELT courses related to SD and integrating ESD in ELT. However, the present scholarship has not yet revealed important information on developing pre-service English teachers' pedagogical content knowledge of sustainability (PCKS) and how to teach or integrate sustainability in English lessons. Other attempts have also failed to provide this information (see Hartadiyati & Rahmawati, 2018; and Echegoyen-Sanz & Martin-Ezpeleta, 2021).

This information is more critical as it can be one of the avenues to achieve the role of teacher education in the global education community, as echoed by UNESCO (2005), making education and society more sustainable. In other words, by revealing a way of developing pre-service English teachers' PCKS, English teacher education institutions have a practical strategy on how to shape the cognition of future English teachers to be more sustainable, thus making the tendency to design or create sustainable pedagogical practices in English classrooms. Thus, undoubtedly, the overarching goal of this study is to elicit valuable information by designing a course on ecocriticism and investigating its impact on English pre-service teachers' PCKS.

Theoretical Background

Ecocriticism and ESD

Ecocriticism is a critical response from literary studies to today's environmental crisis. One of the founders of ecocriticism, Glotfelty (1996), highlights the fundamental premise of literary criticism by stating that "literature is connected to the physical environment" (p. xix). Buell (2005) broadens by asserting an interdisciplinary perspective and pointing out that the study should be "conducted in a spirit of commitment to environmentalist praxis" (p. 430). Not only does it place nature simply by taking it as an object of a literary study, but it also commits to putting the natural environment as a significant entity. Ecocriticism takes a standpoint by agreeing upon a commitment to "…effecting change by analyzing the function – thematic, artistic, social, historical, ideological, theoretical, or otherwise – of the natural environment, or aspects of it, represented in documents (literary or other) that contribute to material practices in material worlds "(Estok, 2005, pp. 16–17).

Glotfelty (1996) notes that ecocriticism has been developed in three stages. The beginning phase aims at raising the reader's awareness by uncovering how nature is represented in literary works. The second stage attempts to rediscover natural writings under-covered or under-sighted by literary researchers. For Buell (1999), the two stages proposed by Glotfelty have a similar concern to see literature as a work of environmental-ethical reflection; later, he names these stages the first wave of ecocriticism. Finally, the third phase of ecocriticism moves to a broader scope, which Buell classifies as the second wave, drawing upon the discourse of nature related to science, history, and philosophy. At the third stage, the philosophical questions about anthropocentrism (human-centered) and the relation between nature and culture are prominent.

The above elaboration shows that ecocriticism highlights how and to what extent texts or cultural practices depict and conceptualize human and non-human juxtapositions with environmental issues. The environmental issues per se can cover general ecological crises and local specificities, such as biodiversity loss, climate change, water scarcity, soil erosion, and pervasive toxification (Heise, 2013). It should be noted that these environmental issues are part of United Nations (UN) environmental sustainability goals, and hence Garrad (2007) avers that ecocriticism and sustainability, particularly ESD, are at the nexus.

Pedagogical Content Knowledge of Sustainability (PCKS)

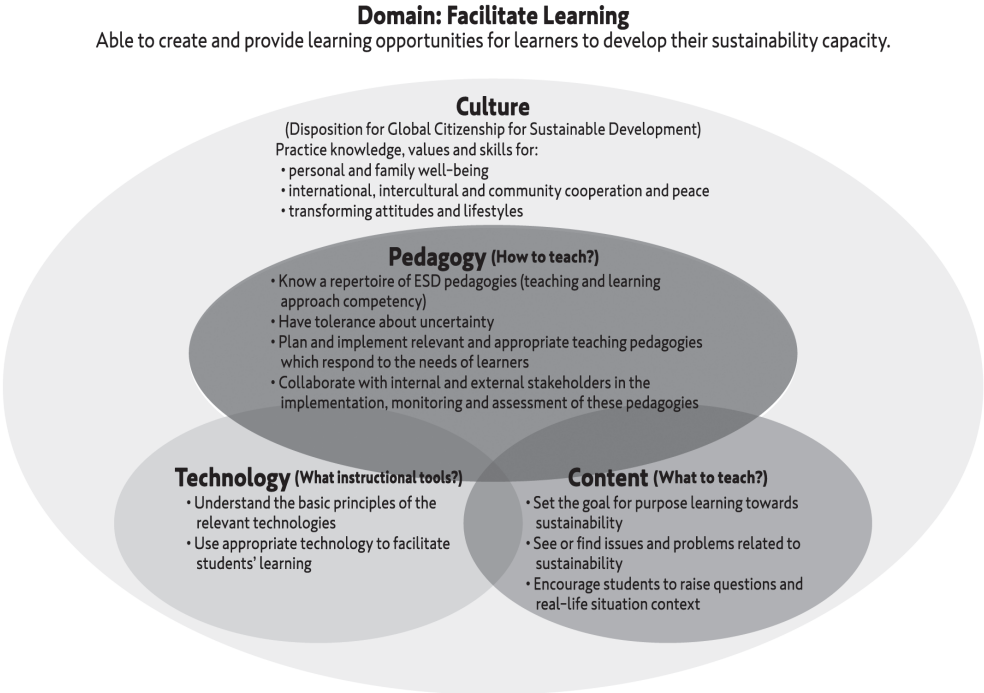
Pedagogical content knowledge (PCK) deals with the understanding of teachers on how to teach the content (topics, problems, or issues) appropriate for learners' diverse interests and abilities (Shulman, 1987). This concept of PCK has been developed due to the advancement of technology and sustainability issues, such as technological pedagogical content knowledge (TPACK), "understanding that emerges from interactions among content, pedagogy, and technology knowledge" (Koehler & Mishra, 2009, p. 66) and pedagogical content knowledge of sustainability as coined in the study of Singer-Brodowski (2017).

This study only focuses on the concept of the pedagogical content knowledge of sustainability. The term "pedagogical content knowledge of sustainability" is mentioned in the study by Singer-Brodowski (2017), and it deals with "the professional actions of teachers of facilitating and monitoring innovative didactic formats in ESD" (p. 852). However, in the study, the domains of the PCKS have not yet been constructed. Fortunately, the second Asia-Pacific Meeting on teacher education for ESD in 2019 produced the Asia-Pacific ESD teacher competency framework, which had three domains in ESD: facilitating learning; continuing to learn and create; and connecting, collaborating, and engaging (Okayama University ESD Promotion Center, 2020).

One of these three domains, facilitating learning, fits with the nature of PCKS. Hence, this study uses this domain to assess the PCKS of the pre-service English teachers. The facilitating learning domain refers to "the ability of teachers to create and provide learning opportunities for learners to develop their sustainability capacity" (Okayama University ESD Promotion Center, 2020, p. 2). The domain has four aspects: culture, pedagogy (how to teach), technology (what instructional tools?), and content (what to teach?). The detail of the domain itself is presented in Figure 1.

Figure 1

Facilitating Learning Domain



Note. Figure 1 is taken from "Domain: Facilitating learning" by Okayama University ESD Promotion Center, 2019, *Guide for the Effective Dissemination of the Asia-Pacific ESD Teacher Competency Framework*, p. 2. Copyright 2022 by Okayama University. http://ceteesd.ed.okayama-u.ac.jp/pdf/200511.pdf

Conceptual Framework

Ecocriticism is interested in disclosing how and to what effects texts or cultural practices depict and conceptualize human and nonhuman relationships with environmental issues, such as climate change, biodiversity loss, and water scarcity. Thus, by nature, ecocriticism and sustainability intersect and support each other. When it is put into a course in language teacher education, this nature is predicted to develop the knowledge of the pre-service language teachers to create and provide learning opportunities for language learners to develop their sustainability capacity or PCKS.

In the ecocriticism course, the pre-service language teachers have vast opportunities to comprehend the concept of ecocriticism itself and its relation to ESD. They can also analyze literary works such as poems, short stories, and songs, which are part of the language teaching materials regarding environmental issues and their relationship with humans and non-humans. These vast opportunities will increase the knowledge of pre-service language teachers to dissect the complex environmental issues in the teaching materials and increase their understanding of the content knowledge of environmental sustainability, which is oriented to developing their prospective learners' sustainability

capacity. They can also learn what technological instructional tools they can use to teach the issues in the language classroom. For example, they can get hands-on sessions on creating environmental sustainability language lessons that develop language learners' sustainable competencies, such as critical thinking and systems thinking.

Thus, this study is interested in investigating whether the PCKS of the pre-service language teachers, mainly English pre-service teachers, can be developed through an ecocriticism course. A related research question is formulated as follows.

Research Question

1) How does an ecocriticism course develop English pre-service teachers' pedagogical content knowledge of sustainability?

Methodology

Research Design

A mixed-method convergent research design helps reveal a comprehensive picture of an investigated issue using quantitative and qualitative data (Dawadi et al., 2021). This study, therefore, employed the design to elicit a comprehensive picture of the impact of the ecocriticism course on the development of English pre-service teachers' pedagogical content knowledge. The design process involved collecting both quantitative and qualitative data of PCKS for the same research question, and the data were then compared, integrated, and interpreted.

Participants

Participants were 47 English pre-service teachers from one of the English education departments in Indonesia, who consisted of 11 males and 36 females. They were in the fourth-year grade. All the participants received the same educational intervention, a course on ecocriticism. In addition, they were asked to fill out a pre and post-survey on PCKS. They were also asked to write ideas of pedagogical practices in integrating sustainability issues into English lessons. Finally, all the participants voluntarily agreed to join the research and signed a consent form.

Educational Intervention: A Course on Ecocriticism

Researchers developed a course on ecocriticism. The course was implemented online during the Covid-19 pandemic with as many as four meetings. From the first to the third meeting, the students studied independently and remotely at home. The online materials about ecocriticism and its relation to ESD were given to the students to learn. Afterwards, the students did an online quiz of independent study in the third meeting. The fourth meeting was online for 2 hours via ZOOM, discussing ecocriticism and its relation to ESD and its implication for sustainable pedagogical practices in English lessons. The outlook of the course can be seen in the appendices (Appendix 1 and Appendix 2).

Instrument

Quantitative

A closed-ended questionnaire was used to obtain data on the English pre-service teachers' PCKS. The questionnaire was adapted from the facilitating learning domain of the Asia-Pacific ESD teacher competency framework, particularly on the self-evaluation sheet based on the framework edited by Okayama University (Okayama University ESD Promotion Center, 2020, p.10). The framework was proposed during the second Asia-Pacific Meeting on teacher education for ESD organized by Okayama University in cooperation with ACCU (Asia-Pacific Cultural Center for UNESCO) and INTEI (UNESCO Chair at York University) with the support of the Japanese National Commission for UNESCO and UNESCO Bangkok.

This study used the facilitating learning domain from the Asia-Pacific ESD teacher competency framework because the domain was aimed at forming or eliciting educators' ability to create and provide learning opportunities for the students, which would facilitate the enhancement of the students' sustainability capacity. Accordingly, using this domain, the study was able to elicit to what extent the English pre-service teachers knew about creating and providing pedagogical opportunities related to sustainability which would benefit their future learners' development of sustainability capacity.

The questionnaire consisted of 12 items slightly adapted to match the participants' context as pre-service English teachers. The items were put in a four-point Likert scale ranging from 1 = *Strongly Disagree (SD)*, 2 = *Disagree (D)*, 3 = *Agree (A)*, to 4 = *Strongly Agree (SA)*. The items can be seen in the appendices.

Qualitative

An open-ended questionnaire was used to reveal the English pre-service teachers' PCKS. In this questionnaire, the students were asked to write teaching ideas about sustainability issues in the English classroom. They were also asked to provide reasons for the ideas. This questionnaire was administered using Google Forms after implementing the ecocriticism course. The questions of the open-ended questionnaire were as follows:

1. Would you please provide an example of what kind of activities you will create/design in an English classroom to make your students sustainable citizens? Please be more detailed and specific.
2. Would you please explain the reasons why you designed those activities?

Data Analysis

The data from pre- and post-questionnaires were analyzed for the quantitative analysis using the paired sample t-test in IBM SPSS Statistics 28. Beforehand, descriptive statistics were performed to provide general information. Besides, for the qualitative analysis, content analysis was used to analyze the data from the open-ended questionnaire.

Results

Quantitative

Table 1 provides the descriptive statistics of the pre- and post-PCKS questionnaire survey, while the paired sample t-test is presented in Table 2.

Table 1

Descriptive Statistics of Pre- and Post-PCKS

		M	*N*	*SD*	*SE*
Pair 1	Pre-PCKS	2.8530	47	.30935	.04512
	Post-PCKS	3.0104	47	.28178	.04110

Table 2

Paired Sample t-test of PCKS

					95 % CI difference					
		M	*SD*	*SE*	lower	upper	*t*	*df*	Sig. (1-tailed)	Cohen's d
Pair 1	Pre-post PCKS	-.157	.326	.048	-.253	-.062	-3.307	46	< .001	-.48

The above results (Tables 1 and 2) showed that the participants' PCKS significantly increased in the ecocriticism course, evidenced by a higher mean score in the post-survey (M = 3.0104) than in the pre-survey on systems thinking (M = 2.8530) and the significant result in paired sample t-test, t (46) = -3.307, p < .001; d = -.48.

Qualitative

Considering that each participant was asked to write teaching ideas and their reasons, there were 47 teaching ideas. Generally, their teaching ideas evolved around four ways of integrating sustainability issues in English instruction: role play, learning from real-life environments and daily practices, discussion, and debates.

The first way of integrating a sustainable environment in the English classroom is through a role play. For example, SS3 proposed a role play idea by dividing students into two groups; the first group played the role of an oppressed environment, and the other group was a good environment. Both groups played roles to compare which conditions significantly affected the universe. SS3 proposed this idea because the students could quickly learn from the make-up situation when learning sustainability issues appeared.

> *I will try to set my class with role play that there is one group being oppressed environment followed by unaccepted human behavior. The other group will act in a peaceful atmosphere where humans and non-humans will live peacefully. So, the students will learn which one has better condition and makes a big impact on the universe. (SS3) I designed this because the students will easily relate to the fake situation that we made. So they will think wisely which one is better to choose. (SS3)*

The second way is through learning from real-life environments and daily practices. Most participants mentioned bringing the students outside the classroom to learn from the real-life environment and daily practices such as observing trash, reducing, reusing, and recycling activity, and doing service-learning to communicate waste management. They chose those ideas because those were more related to sustainability instruction and could give sustainability experiences to the students. Examples of participants echoing these ideas are provided below.

> *I will make them learn through the surrounding environment, so that learning is more interesting and fun, because so far what I have researched is the lack of interaction and lack of concern for the surrounding environment, for example: "throw out the trash in its place". (SS30) These small steps will have a big impact in the future because, in my opinion, we should not only focus on academic values but on good morals too, who can respect and care for the environment well. (SS30)*
>
> *I will build a class with a caring environment by taking a look at their own trash, so the students will learn a lot about how and why they throw things away. Students will also conduct a service-learning project, and in doing so, find ways to cut down on the waste they produce and get to know how waste is managed in their community. (SS37) I think all of this is a truly sustainable teaching and learning experience for English students. (SS37)*
>
> *To maintain life for future generations, the teacher can provide the activities where students become a sustainable citizen. In this chance, I will provide an activity for easy-to-do with a sustainability theme for middle school students. By giving reduce, reuse, and recycle activity, students often do not know which resources are renewable and which are nonrenewable, or which are recyclable or reusable. In this activity, students will learn what these terms mean and discover why sustainable use of natural resources is so important. By fulfilling this activity, students will become sustainable citizens. (SS39) Students have to balance their mindset and critical thinking. (SS39)*

The third way of integrating sustainability issues is through discussion. The participants echoed idea of facilitating the students to discuss sustainability goals or issues. They mentioned that this activity would raise students' awareness of sustainability, develop their social skills such as listening and collaboration, and induce their creative thinking to find solutions to address the issues. One example is from SS12 provided below.

> *Activity: Discover and prioritize the sustainability goals. The aim of this activity is to introduce sustainability goals, such as building a better world & prioritizing global goals and letting them make choice. Instruct a pair of students to name the goals and benefits of those goals. For example: (name of goal) peace and justice – (goal) to ensure an end to violence and war to make all people feel justice. (SS12) This can directly raise people's awareness of sustainability issues wherever they live, develops social skills such as listening, collaboration, as well as promotes creative thinking skills to find a solution. (SS12)*

The fourth way is through debates. They believed that debates were an excellent approach to learning sustainability. The participants explained that the students could be given sustainability issues and assigned different sides (affirmative and negative groups). This way, the students would get more knowledge and awareness of the issues, encouraging them to become sustainable citizens. One of the instances is from SS47 presented as follows.

> *Debates are an excellent approach to get students to debate about sustainable issues. Assign students to various sides of an argument, allow them time to investigate, and have them discuss the topic. (SS47). Indirectly, they can get more knowledge from the activities. They will encourage students to become sustainable citizens. (SS47)*

Discussion

The quantitative results demonstrated a higher mean score in the post-survey than in the pre-survey and a statistically significant p-value on the paired sample t-test. The qualitative results also showed that the English pre-service teacher could generate four ways of integrating sustainability issues in English instruction: role play, learning from real-life environments and daily practices, discussion, and debates. Thus, both quantitative and qualitative results agree that the PCKS of the English pre-service teachers was developed in the ecocriticism course. It means that the ecocriticism course could facilitate the development of English pre-service teachers' knowledge to create and provide learning opportunities for English learners to develop the learners' sustainability capacity.

The possible reasons for the development of PCKS are as follows. First, the nature of the ecocriticism course integrates the content of ecocriticism and sustainable development issues, facilitating the students' acquisition of knowledge about sustainability issues depicted in the literary teaching materials, such as poems, movies, or songs. Second, the course provides hands-on English instruction on sustainability issues using literary works. Accordingly, the students can comprehend how sustainability issues are integrated into the English instructional activities. The hands-on activity opposes Garrard's (2012) idea on the preferable use of a didactic approach when designing learning instruction. In the course, the pre-service teachers proposed a sustainable learning design reflecting their dynamic learning activities instead of teacher-centered learning.

The four designs of role play, observing the students' real environmental problems, discussion, and debate in the course also align with Webster's (2004) ideas about the importance of constructing dynamic and student-centered learning for sustainable pedagogy. Furthermore, sustainable pedagogy in this study aligns with the research by Putri (2018) who revealed the impact of project-based design in the form of an environmental storytelling on students' concern about local environmental wisdom. Thus, sustainable pedagogy is very critical and, hence, the ecocriticism course in this study can provide a chance for the pre-service teachers to learn how to generate questioning strategies that can develop English students' self-awareness of environmental sustainability and critical thinking. In addition, the ecocriticism course which favours sustainable pedagogy can also prepare future English teachers to be "green" moral agents, as Saiful (2020) opined. Accordingly, they will have knowledge not only to teach grammar and vocabulary

of literary works in the English classroom but also to discuss the issues of environment, which instils the sense of loving Mother Gaia to their students (Saiful, 2020).

The findings of this study also demonstrated the nexus of ELT and sustainable education. Using English environmental literary works as teaching material, the students understand the sustainability issues related to the environment and social domain, such as gender. It reflects one of the ways of possible integration between ELT and sustainable education, which supports the claim of Tavakkoli & Rashidi (2020) on the juxtaposition of TEFL and sustainable education. In the Indonesian context, the findings resonate with Jacobs et al. (2006) on the idea of combining the UN's six Environmental Education objectives which include knowledge, awareness, attitude, skills, evaluation ability, and participation into the tailor-made English coursebook as teaching material. However, they had challenges to convince English teachers to use the coursebook. This study suggests another alternative to use English environmental literary works as teaching material to learn about environmental sustainability. An ecocriticism workshop can also be organized to mitigate the knowledge gap of the teachers in implementing the suggested teaching material. It is expected that this way (using the workshop and the alternative teaching material), the teachers will have more willingness to integrate environment sustainability in ELT.

Furthermore, the findings suggest that reorienting English teacher education towards sustainability is possible through the presence of an ecocriticism course which is not always about specific climate change courses. It extends the notion of Findik et al. (2021), stating that the reorientation of English teacher education towards sustainability can be through English language teaching-specific courses on SD. Besides, the findings, which reveal the integration between ecocriticism course and sustainability in English teacher education developing the PCKS of the pre-service English teachers, put the recommendation of Ganji et al. (2020) into reality. They strongly recommend developing courses related to sustainability for English teachers at the university level. In addition, considering ecofeminism to be one of the approaches of ecocriticism study (Garrard, 2012), our findings in a way extend the findings of Echegoyen-Sanz & Martin-Ezpeleta (2021), who claimed that ecofeminism could serve as a tool to enhance sustainability attitudes in pre-service teachers. Furthermore, according to our findings, the ecocriticism course gives more benefits, developing PCKS of pre-service teachers, particularly pre-service English teachers. Accordingly, we suggest including ecofeminism as one of the thematic topics in the ecocriticism course.

Conclusion

The study has presented how to develop PCKS of pre-service teachers, particularly in the English teacher education field, through an ecocriticism course. However, it should be noted that this study has limitations in many respects. First, the context of this study is limited to pre-service English teachers. Hence, further studies may involve broader contexts, such as pre-service science teachers, and examine whether the PCKS can still be developed in these contexts.

Beyond this limitation, this study has a valuable practical implication in reorienting English teacher education towards sustainability. Our findings inform that the ecocriticism course benefits the development of pre-service English teachers' PCKS. Accordingly, the ecocriticism course is suggested to be included in the curriculum of English

teacher education institutions to shape the cognition of future English teachers to be more sustainable, which can promote designing or creating sustainable pedagogical practices in English classrooms.

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Appendix 1

A Course on Ecocriticism

Meetings	Learning Objectives	Instructional Activities
1st Meeting (Independent Study) Anytime remotely at home	• Able to elaborate the history and tropes of ecocriticism.	• Watch videos about ecocriticism and answer related questions about ecocriticism
2nd Meeting (Independent Study) Anytime remotely at home	• Able to elaborate how ecocriticism can be an avenue to achieve sustainable development goals (SDGs). • Able to figure out where to find sustainability issues and how ESD looks like when it is implemented in English lessons.	• Watch videos about Ecocriticism and its relation to ESD. • Watch videos about sustainability issues and ESD implementation in English classrooms. • Answer related questions about ESD and its implementation in English lessons.
3rd Meeting (Independent Study) Anytime remotely at home	• Able to figure out how to analyze literary works which can be used as teaching materials using ecocriticism lens. • Able to figure out the product of research related to ecocriticism.	• Watch a video on how to analyze movies using ecocriticism lens. • Read a research article about ecocriticism. • Answer reflection quizzes related to topics of learning from 1st to 3rd meetings.
4th Meeting (Online Discussions) 120 minutes	• Able to explain ecocriticism, nature and movement as well as its nexus in ESD and sustainability issues. • Able to analyze literary or digital media works using ecocriticism lens. • Able to design an ESD and ecocritical English lesson related to sustainability issues. • Able to create questions for critical discussions which discuss sustainability issues.	• Listen to a lecture about ecocriticism and ESD. (**30 minutes**) • Hands-on practice 1: analyzing literary or digital media works using ecocriticism lens. (**45 minutes**) • Hands-on practice 2: designing an ESD and ecocritical English lesson and questioning strategy related to environmental protection and sustainability. (**45 minutes**)

Appendix 2

Pedagogical Content Knowledge of Sustainability Questionnaire

No.	Items	Strongly disagree	Disagree	Agree	Strongly agree
1.	I know the repertoire of Education for Sustainable Development (ESD) pedagogies.				
2.	I have tolerance about uncertainty.				
3.	I know how to set the goal for purpose learning towards sustainability.				
4.	I know how to plan any action plan or activities to solve issues (problems) on a local/global level.				
5.	I know how to collaboratively plan and implement integrated methods to solve problems.				
6.	I know how to facilitate students' support to collaborate with each other or with other community members.				
7.	I know how to work together with other subject teachers or other stakeholders.				
8.	I know how to see or find issues and problems related to sustainability.				
9.	I know how to encourage students to raise questions in the real-life situation context.				
10.	I know how to develop analytical and critical thinking to solve problems.				
11.	As a future teacher, I have a positive attitude and aptitude towards learning and learners.				
12.	I know how to foster multicultural literacy.				