

# Understanding pre-service geography teachers' conceptions of nature using photovoice

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## Abstract

This study explored how pre-service geography teachers conceptualize "nature" using photovoice. The researcher analyzed the participants' data to extract six themes: primary nature, secondary nature, nature as the law of things, nature as a relational geography, nature as a threatened place, and nature as a necessity for human well-being. The participants said that their conceptualizations of nature helped confirm their experiences and the level of their conceptualization of nature acquired through school education. This study has also helped the instructor understand students' levels of conceptualization of nature and is significant as a guide to planning and practicing follow-up classes.

**Keywords:** pre-service geography teachers, nature, conception, photovoice, themes

## INTRODUCTION

Exploring the relationship between humans and nature is one of the important purposes of geography and geography education. Earlier, Graves (1984) drew on Hirst's concept of forms of knowledge and said that geography has a comprehensive character that encompasses mathematics, natural sciences, and humanities. Nevertheless, the dichotomy between natural and human geography or nature and humans (social and cultural) continues to be a problem in geography and school geography (Castree, 2005; Castree & Braun, 2001; Morgan, 2012; Sayer, 1979). The problematic perception of this dichotomous perspective is not limited to school geography. For example, science education has received increased interest in STEAM education as part of efforts to break down the boundaries between disciplines and foster creative and personable students.

In this context, geography has emphasized the search for the relationship between humans and nature; however, serious consideration is needed for the problems that nature and humans have been taught separately. With the emergence of the concept of the anthropocene (Crutzen, 2002), reflecting on our perspective of nature is more important than ever as global climate change and environmental problems are

recognized as being caused by humans (Morgan, 2012; Pawson, 2015). In particular, it is very important to understand how pre-service geography teachers, who would teach geography in secondary schools in the future, conceptualize the relationship between humans and nature. This is because their conceptualization can have an important influence on their future students' conceptualizations of nature.

Instructors want to start their classes with students' knowledge and experience and attempt to connect what they are trying to teach with what their students already know. Understanding the aspects of students' lives that impact their views of the relationship between humans and nature in terms of geography can have significant impacts on how instructors understand and teach their students. By understanding students' experiences and perceptions of humans and nature, teachers will be better prepared to implement educational practices pertaining to the teaching of geography (Leydon et al., 2016). As an instructor who teaches pre-service geography teachers in a *human and nature* course at a university, we are always thinking about how to connect what we want to teach with the geography that students have. So, how can we make such a connection?

We believe that as a participatory action research method, photovoice is a useful way to "connect with students." We think it is an attractive activity to start a

### Contribution to the literature

- This study shows how pre-service geography teachers conceptualize nature using photovoice.
- This study allowed pre-service geography teachers to confirm their level of conception of nature acquired through their experience and college education.
- Pre-service geography teachers' conception of nature provide instructors with important guidance in planning and implementing future environmental education.

*human and nature* course in a new semester because it provides students with cameras to create images of their ideas. We were both afraid of and interested in starting *human and nature* course with the photovoice project, wondering how our students conceptualized nature, especially its relationship with humans. Rather than unilaterally imparting knowledge of the relationship between "humans and nature" to our students, we wanted to connect them with their own conceptualizations of humans and nature.

To date, most researchers on students' conceptualizations of nature have examined how children perceive the natural environment in terms of ecopsychology as part of environmental education (Adams & Savahl, 2015; Adams et al., 2016; Burgess & Mayer-Smith, 2011; Keliher, 1997; Phenice & Robert, 2003; Taylor, 2011), but no researchers have examined how pre-service geography teachers majoring in geography and geography education conceptualize nature. Therefore, the purpose of this study is to explore the conceptualizations of nature of pre-service geography teachers who take *human and nature* course using photovoice as a pedagogical tool along with action research. With this study, we provide detailed and diverse perspectives on how prospective geography teachers perceive nature, as well as implications for future classes on nature.

### NATURE IN GEOGRAPHY: A CONTESTED CONCEPT

Nature is a term for argument that can have many meanings (Habgood, 2002). It can be used to refer to a set of external laws and regularities that are likely to govern the universe or everything nonhuman, the part of the universe that is not created by humans (Haines-Young, 2009). The concept of nature is central to science, as well as in the distinction between human geography and physical geography (Ginn & Demeritt, 2009). Malone (2016) considers three main perspectives on the relationship between humans and nature: humans are inherently close to nature, modern life is disconnected from nature, and there is a lack of engagement in nature.

In other words, this relationship can be characterized as being potentially more or less in nature, as "connected or disconnected" from nature and as "dominant nature." However, all three perspectives regard humans as exceptional. In other words, the world is viewed in a

dichotomy such as human/natural or object/subject. The fact that there are various perspectives on the relationship between humans and nature means that "nature" does not have a unitary concept. Therefore, each person or scholar has a different perspective on nature and a different way of conceptualizing nature. A person's construction of nature varies depending on the individual's gender, age, sociocultural background, etc. (Adams & Savahl, 2016; Linzmayer & Halpenny, 2013).

However, the opacity of whether nature includes humans is a long-standing debate with a historical focus and is an indicator that established social and cultural politics are solid in these delineations (Macnaghten, 1993; Macnaghten et al., 1999). The debate generally revolves around three main meanings. Earlier, Williams (1983) offered three perspectives on nature, and since then, many scholars, including Ginn and Demeritt (2009) and Macnaghten (1993), have borrowed those three perspectives. Williams (1983, p. 219) famously observed that "nature" is probably the most complex word in English. He embodied three broad but complexly interconnected meanings. First is an intrinsic nature that refers to the elementary or essential characteristics of a "thing" (e.g., the nature of childhood or the nature of social exclusion, that is, the nature of things). Second is external nature, which refers to the pristine or "untouched" material world or the external, unmediated material world outside humanity (e.g., natural environment). Finally, there is universal nature, which refers to the all-encompassing force controlling things in the world, that is, universal law or reality (e.g., natural laws or "mother nature") that may or may not include humans (Ginn & Demeritt, 2009; Macnaghten, 1993; Macnaghten et al., 1999).

As long as all three broad meanings evoke a vision of singular, abstract, and anthropomorphic nature, there is a central ambiguity about whether they include humans. Is human nature (meaning 1) determined by some intrinsic and biological force (meaning 3) such as our genes, or, as many so-called environmental determinists of the late 19<sup>th</sup> and early 20<sup>th</sup> centuries believed, by our natural environment (meaning 2)? Or is it that humans, distinct from other animals, can use our rationality to go beyond our basic biological instincts? (Ginn & Demeritt, 2009). This ambiguity about whether nature includes humans is not new, and historical focus shows that strong cultural politics are at play in this distinction. Wildness is an unconscious expression of the colonialist

way of looking at nature culturally and historically. In short, it is a social construction. Far from being the only place to be distinguished from mankind, the wild is a fairly profound human creation. In fact, it was created by a very special human culture at a very specific moment in human history (Cronon, 1995, p. 69).

Subsequently, the debate over the operationalization of nature follows two different trends. First is criticism of an all-inclusive, that is, absolute, view of nature, and second, an argument for the centrality of the concept (i.e., nature) (Attfield, 2006). Some scholars (e.g., Attfield, 2006; Braun, 2002, 2004; Castree & Braun, 2001; Castree & MacMillan, 2001; Giddens, 1994; McKibben, 1990; Merchant, 1979, 1996) argue that nature has become socialized (i.e., the social construction of nature or social nature) and that “pure nature no longer exists.” In other words, we have reached what McKibben (1990) calls “the end of nature.” McKibben’s (1990) argument resonates with criticism that pure nature, untouched by mankind, no longer exists. Meanwhile, Krist (2004, p. 6) criticized the postmodern constructivist view of nature and argued that the social construction of nature is “narrow and politically undesirable.” She argues that although constructivists strive to reveal sociocultural origins, they do not deconstruct their own rhetoric.

## PHOTOVOICE METHODOLOGY

Photovoice is a methodology of community-based participatory action research established by Wang and Burris (1994, 1997) to identify labor issues that affect the health of women living in rural China. The methodology is based on techniques of feminism and documentary photography, including Freire’s (1968) critical pedagogy, that emphasize education through dialogue, empowerment, consciousness, praxis, and critical literacy (Wang & Burris, 1994). Wang and Burris (1994) used photographic images instead of text to break barriers to women’s participation in research, especially the participation of illiterate, rural women.

Photovoice allows researchers to recruit marginalized individuals or groups from the community as participants and provide them with cameras to take pictures and visually document their lived experiences of social and spatial issues in their communities and document their voices (story or narrative) about the photographs. The results are then shown to decision makers or policymakers who are at the forefront of resolving such issues to participate in social change and realize social justice in communities.

The photovoice process requires participants to take pictures related to the topic (mainly issues in the community) and record their voices in each picture. Photographs and narratives become the medium for communication between participants and researchers. Participants share their thoughts behind the photographs, their beliefs about what the photographs

represent, and their attitudes toward the photographs with the researcher (Kroger & Meyer, 2005).

Recently, photovoice has been used as a pedagogical tool in schools beyond the level of participatory action research. However, there are limitations and considerations in using the photovoice methodology as a pedagogical tool. To adapt the original photovoice of Wang and Burris (1994, 1997) for use as a pedagogical tool, it is necessary to make changes in the lesson planning and implementation as well as facilitate a shift in participants’ awareness (Chio & Fandt, 2007). For example, the lesson plan should set how wide or narrow the topic is and whether the assignment is an individual task, group task, or mix of two. Chio and Fandt (2007, p. 496-497) presented a major three-step process for lesson planning: phase 1 is the “statement of aims,” while phase 2 is the “selection of assignment,” and phase 3 is for “identifying issues, taking pictures, selection and presentation of photos, group discussions, and documenting stories.” Originally, photovoice participants were residents who were alienated from the community, but when using photovoice as a pedagogical tool, the participants should be students who are the subjects of learning. Therefore, when using photovoice as a pedagogical tool, researchers should pay special attention to the safety of the participants, namely students. Researchers once provided disposable cameras to participants, but recently, it is convenient to use the cameras that are built into mobile phones. In addition, there is no need to limit the scope of the community to places, where students actually reside. These modified photovoice methods are described in detail in the following.

## METHOD

### Research Questions & Context

The key aim of this research paper was to investigate how secondary school pupils perceive nature and implications for geography subject. Specifically, we wanted to answer two questions:

1. What do students think about “nature” outside the classroom?
2. How can we use what we have learned from “nature” outside the classroom represented by our students for future geography lessons, including *human and nature*?

The question “what is nature?” has been debated throughout the years, as the discipline has changed and developed over time. The debate around the content of the subject continues to influence teaching and learning at all levels (Burnett & Crowe, 2016). We used a modified version of the original photovoice methodology to get answers to learn from our students. Where the original photovoice methodology is set in a community, the modified photovoice version focuses on the classroom.

<b>Show me nature</b>	
Group name: Name: So far, you have studied quite some geography and the relationship between humans and nature through elementary, middle, and high schools and university. If we were to ask you, "Show me some nature," what picture would you click? Paste below a picture you took and caption it in the form of answers (narrative) to the following questions.	
<b>Photo</b>	<p style="text-align: center;"><b>Narrative:</b></p> <ul style="list-style-type: none"> <li>▶ <b>Where did you take this picture?</b> (inside or outside school, home, outside home, or others)</li> <li>▶ <b>What does this picture represent?</b> (more than two sentences)</li> <li>▶ <b>How does this picture show nature?</b> (more than two sentences)</li> <li>▶ <b>Why did you choose this picture?</b> (more than two sentences)</li> </ul>

**Figure 1.** Worksheet: "Nature in a picture" (Source: Authors' own elaboration)

We wanted to know the students' perspectives and beliefs about nature and what students should do to understand and develop their thoughts, perspectives, and beliefs about nature. These thoughts, perspectives, and beliefs will be available for future lectures.

### Photovoice Project

We conducted a photovoice project with 20 (eight male and 12 female) pre-service geography teachers taking *human and nature* course in the first semester of 2021. For two weeks, we delivered lectures on the photovoice methodology. In the third week, we presented theme for project's tasks: "Show me nature."

The participants were given two weeks to take five pictures that best represented their thoughts about nature using their cell phones. They were assigned two locations and were required to click one photo each on and off campus and inside and outside their homes; the last two photos aimed to reveal the participants' conceptions of nature irrespective of a specific location.

The participants were asked to present their narratives about the pictures by pasting the pictures on a worksheet titled "nature in a picture" (Figure 1). The pictures attached to the worksheet and the accompanying narratives revealed each participant's personal representations and ideas of nature. These data will encourage future instructors to undertake student-centered inquiry in future *human and nature* geography courses and expand the classroom environment by incorporating students' lives outside the classroom. During the eighth week of class, group discussions were conducted. The participants gathered in groups to explain how their pictures represented nature and engage in discussions based on their worksheets. Their photos and stories or narratives acted as tools that answered the query: "What is nature?"

Subsequently, each group was required to modify its story or narrative based on mutual feedback. They developed material for group presentations based on the

five completed worksheets in each group. Furthermore, they were required to draw a concept map using the ideas and narratives represented by the photos. A concept map is an excellent tool to outline comprehensive pictures of nature.

Photographs of the participants' views of nature, their stories (narratives) about these photos, and their conversations with myself were important components of the photovoice action research. We tried our best to ensure that the participants did not feel that their photos could not be evaluated for their knowledge of nature; they were assured that their photos and narratives were tools for thinking and discussing their ideas and beliefs about nature.

### Methods of Data Generation & Analysis

In this photovoice project, students had to take, choose, and interpret pictures that they thought were nature. The research data were generated through pictures, narratives, and unstructured interviews as prompts, and we analyzed the data to understand how students represent nature. The pictures of the students used in this paper and the narratives they gave meaning to each picture have their permission, and the names of the students mentioned are pseudonyms. Two methods were applied when analyzing the data.

First, the researchers utilized a six-step guide to perform theoretical thematic analysis (Braun & Clarke, 2006). Theoretical thematic analysis is closely related to the theoretical propensity of the researchers and is generally coded to match the research goals. In step 1, the researchers immersed themselves in the data by repeatedly reading scripts to get used to the data. In step 2, an initial code was generated, and in step 3, the focus was on identifying themes based on the initial code. In step 4, the themes were reviewed and improved, and in step 5, the themes were defined, and the final names were given. In step 6, the research results were produced on the basis of the analysis over the previous five steps.



This is a picture of the natural landscape in my hometown, Dangjin Waemok Village. The nature that I thought of is out of human reach. This is because when you say “natural,” the meaning is not artificial and there is no weirdness. I thought that the bedrock and the wave-cut terrace that formed a particular shape due to erosion from the sea and the waves in this picture were nature because they were not meant to be made by humans (Park).

**Figure 2.** Sea & wave-cut terrace (Source: Field study)

Second, we also employed the grounded theory proposed by Charmaz (2014) to analyze the data. It is a qualitative research approach first developed by Glaser and Strauss (1967) in the 1960s (Heatha & Cowleyb, 2004). Grounded theory is a systematic and repetitive set of methods for constructing “grounded” theories in data (Charmaz, 2014; Strauss & Corbin, 1998). It enables developing themes according to the data analysis process, rather than any preformed category. All the photos, narratives, and other data obtained through interviews were coded in order of open, axial, and theoretical coding. Coding is an important step in the analytic process, as it crucially links data collection and the development of creative theories for explaining data. The coding process conceptually abstracts and recombines data (Charmaz, 2014; Holton, 2010; Strauss & Corbin, 1998). Line-by-line coding was used, which involved developing in-vivo codes of particularly rich segments of the text and photo data, followed by focused coding. This step in the methodology entailed reexamining and re-coding the data with conceptual codes that emerged from the line-by-line analysis.

The data were analyzed with a view to identifying recurring or significant themes. The descriptions of the students’ conceptions are not associated with particular individuals but are constructed from a pooling of data across a group of individuals, where variations would be expected. However, they do offer greater generalization than case studies of specific students. The value of the approach lies not in its generalization but in its detailed understanding of particular phenomena in context—in this case, pupils learning geography and the relationship between humans and nature. We used grounded theory to analyze a total of 100 photos and narratives taken by 20 students and initially identified eight themes. However, these themes had some overlapping parts; hence, reanalysis then led to the combination of some categories and the rejection of others, leaving six themes of what the students think nature is.

## RESULTS

### Primary Nature: Pure Nature of Nonhumans

Nature has traditionally been considered to be outside or beyond human beings (societies and cultures; Anderson, 2009). Nature means a state in which there is

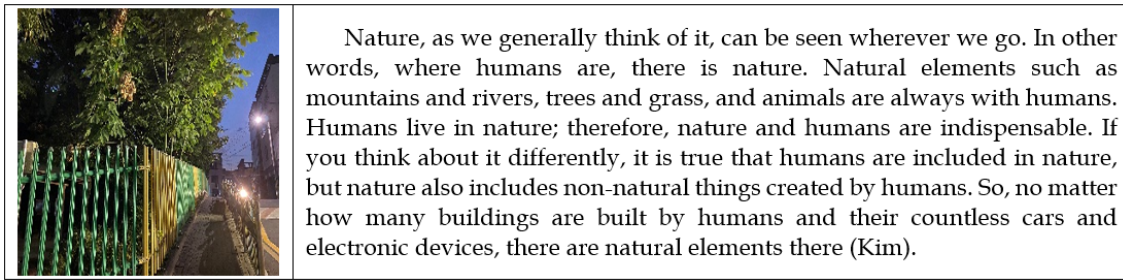
no human being, and this means that nature must be pure and sometimes isolated. The pure nature of nonhuman beings has a similar meaning to primary nature or external nature or nature as external to the self (Adams & Savahl, 2015). As discussed earlier, Williams (1983) provided three perspectives on nature of which external nature is the pristine or untouched material world outside of humanity (e.g., the natural environment), untouched by human influence. Further extending this meaning, it is associated with the phrase “nature is everything in the world” or “nature is everywhere” (Adams & Savahl, 2015).

The participants in our study most often represented pure nature that was out of human reach; they expressed a preference for natural places that were less affected by humans, for instance less polluted. Many participants represented an idealized view that “real nature is pristine and peaceful” regardless of family background and previous outdoor experiences

Many participants identified plants (trees, grass, weeds, and flower grass), flowers (cherry and cosmos), animals (pet dogs, pet cats, stray cats, and birds [bird’s nest, magpie, crow, sparrow, pigeon, heron, and crane]), similar to the children’s and adolescents’ perceptions of nature found by Keliher (1997) and Wals (1994), respectively.

However, the students also represented higher levels of nature, such as the sky, clouds, sunset, mountains, water and rivers, sea, land and soil, topography (bedrock and wave-cut terrace) (Figure 2), and climate. Regardless of previous experience, these participants thought that nature could be found almost anywhere (Figure 3).

However, when we asked the participants to define what nature means to them, they mentioned plants the most and took many pictures of plants, including at least one tree. Many participants included fewer animals in their pictures, but they indicated in their interview responses that just because there were fewer animals in the pictures did not mean that they did not associate animals with nature. Because most of our students lived in cities, their pictures simply contained fewer animals than plants. They obviously regarded animals and plants as nature wherever they were found. Indeed, one participant volunteered that nature is “everything in the world.”



**Figure 3.** Nature is everywhere (Source: Field study)

Many participants believed that “nature is everywhere,” but they also had an idealized view that “true nature is clean and pure.” Many participants distinguished between the nature in their suburban environments and the pure nature in natural places that are relatively untouched by humans. This idea distinguishes between the beliefs that nature is everywhere and that it can be found in natural places, where human touch is rarely seen, reflecting the paradox that these natural places are good because they are not polluted. As described above, many participants expressed their desire to exclude humans from nature; in this dichotomy between humans and nature, nature is threatened, and nature as a place with nothing. Part of the reason is that physical and human geography are separate subjects in the Korean geography curriculum and textbooks.

These participants’ thoughts about pure nature as being out of human reach can be said to be an idealized image of nature. In addition, it can be said that this is the epitome of a modern way of thinking that considers humans and nature as existing in a dichotomy. This view that humans are not part of nature but separate originated from the Christian ethics that cultivated the Renaissance and modern science. Christian doctrine has completely grounded the practice of thinking about human culture separately from nature in Western society. Castree and MacMillan (2001, p. 208) argue that this separation between humans and nature has become unquestionably familiar and fundamental. This boundary building shows how humans should deal with the material world of nature, as well as geographical distinctions such as “here” for nature and “there” for humans (social and cultural). This conceptual separation between humans and nature is created by humans and is a product of long-term social development. The separation of humans and nature motivated humans not only to measure and value nature but also to develop tools for manipulating and using nature. Human practices toward nature have substantial impacts on nature. Even if humans are simply reviving nature, humans recreate nature (Anderson, 2009).

### **Social Nature or Secondary Nature (Manmade Nature)**

Many recent studies in critical geography have sought to question the traditional understanding of

nature and the Enlightenment dualisms associated with it. One of the most important movements in this regard is the argument that nature is somehow socially constructed and contingent and not intrinsic, external, and universal (Cronon, 1995). This argument takes various forms in various traditions of critical geography (e.g., Marxism, feminism, and relational geography) (Demeritt, 1994, 2001, 2002).

Marxism, in particular, is very critical of the perceived dualism of nature and humans. Karl Marx was one of the first theorists to claim that nature was socially “produced” or constructed. Marx meant this in a material sense—people strive to transform raw matter (first nature) into a second, social nature (Castree, 2005). Marxist geographers stress that the relationship between humans and nature is the product of capitalist social relations. They suggest that how nature is thought about and represented determines how it is economically and politically exploited and used. Marxist geographers understand the restoration of nature as destroying “primary nature” and argue that first nature gradually turns into a resource to support the capitalist system. In other words, primary nature (a completely unpolluted natural world) is transformed into secondary nature (a commercialized nature to produce output for a capitalist system, such as oil as fuel, trees as wood, and cows as a source of meat, milk, or leather) or tertiary nature (a world, where there are plant and animal groups, where humans have manipulated genes to obtain more benefits) (Anderson, 2009). As this material reconstruction of nature becomes frequent, it leads to a concept of social nature, where nature no longer exists in its traditional form, that is, something that exists outside of humans.

The concept of social nature emphasizes that nature is inseparable from the society that forms it. Scholars who argue for social nature criticize the claim that there is already nature in the “there” that can be objectively defined and studied. Instead, they see that knowledge of nature cannot be obtained without reference to society. In other words, nature is a social construction that can be used politically, that is, as a tool of social power (Castree & Braun, 2001). Social nature has been the dominant perspective for human geographers to understand the relationship between humans (social) and nature (Morgan, 2012).

According to social nature, it is wrong to think that nature consists of minerals, water, air, and living things that have not been touched by humans. Of course, there are very few environments or ecosystems that humans have not interfered in, but they still exist. Generally, however, nature is a place, where the human touch has reached, and what we call nature is actually the result of humans' so-called economic process. For example, agriculture is not a natural result of favorable soil and climate but a result of capitalist agricultural activities (Coe et al., 2007). Researchers have emphasized that the relationship between humans and nature can only be understood by relating resource use patterns to political and economic influences (Robbins, 2004). Therefore, it is important to consider how humans reproduce nature. In a capitalist society, it is important to find out how nature is reproduced and who controls this reproduction of nature (Smith, 1984).

Many participants conceptualized nature as primary nature, a traditional nonhuman pure nature, but some conceptualized it as social nature. However, they only represented the perspective of secondary nature; none of the participants mentioned the tertiary nature. Specifically, some participants indicated the social construction of nature (i.e., social nature), manmade nature, and secondary nature in various plans and developments, advertisements, and products. They showed that nature is created and changed socially, and simultaneously, society is based on the transformation of nature. As the elements that comprise nature are used and valued by human society, nature and society exist as they cross these boundaries. Recently, humans have transformed nature into usable, owned, and tradable products. This commercialization of nature greatly obscures the line between nature and society. The places, where nature is commercialized are For example, mines, quarries, farms, dams, and canals are places, where natural raw materials are converted into products.

Meanwhile, natural food is very popular these days. If you walk down the aisle of a local supermarket, you can encounter all kinds of products boasting "all natural" or "organic" ingredients. Often the wrappers are decorated with pictures of green fields dotted with grass-eating cows or maybe places young children play happily. We are bombarded by advertising, but we rarely have time to question the series of connections and myths it echoes and expands upon. These rural images are part of a long tradition of idyllic art and poetry that praises nature and the countryside as the true home of mankind. In the context of food packaging, the images serve to reassure consumers about the quality, freshness, safety, and sustainability of the products by rhetorically positioning them in the Edenic environment of familiar, healthy, and leisurely life. In most supermarkets, imagined geographies of nature do not show factory farms, pesticides, processing plants, or migrant farm

workers working as slaves from dawn to dusk (Ginn & Demerit, 2009).

Some participants did not use the term social nature but specifically represented how nature is commercialized and manifested in a capitalist society. For example, they represented food, clothing, shelter (barley beer, fruits, animal leather, or limestone concrete), buildings decorated with the concept of nature, the commercialization of natural landscape, ornamental fish in fishing ports, theme parks based on nature, zoos built to protect animals and to pursue human joy, plantation farms, processing plant construction, labor exploitation, the Daegu e-world starlight festival (artificial natural works), artificial leaves decorating the walls inside a restaurant as human-made nature, fountains, canals, and ecological rest areas. In addition, some participants explored how natural landscapes are commercialized and operated through plans for zoos, parks, and urban gardens by arranging nature in places in the city. They focused on how humans recreate nature in pursuit of profit and how they consume the nature produced.

Taking an example of an ecological rest area in the middle of Waryong Mountain in Daegu, one participant said,

All the places, where the trees were originally lush were cut and turned into playgrounds for children. To create a space for ecological rest in our daily lives, we face a contradiction that we have to endure ecological destruction.

Another participant took and posted a picture of a company's advertising copy "a gift from nature" under the title of business ability and questioned whether the product promotion phrase, which includes the word "nature" commonly seen on the street, would be a nature-friendly product. Critically, she revealed a perception that this corporate behavior is a business ability to mislead consumers by over-packaging and marketing products using the word nature (**Figure 4**).

In contrast, especially with the developments in science and technology, nature has not only become an object of development but has also been developed and managed by human power and will. Humans have greatly changed and influenced the natural environment for many years to achieve today's high living standards. Mountain tunnels and highways created excellent accessibility between regions and enabled the active movement of people and goods, and through the development of resources such as minerals, coal, and oil, mankind was able to receive stable supplies of essential things for life. However, humans' development and use of the natural environment is facing limitations today. Mankind has engaged in the indiscriminate destruction of the natural environment, resource depletion, and conflicts between countries to own specific resources.

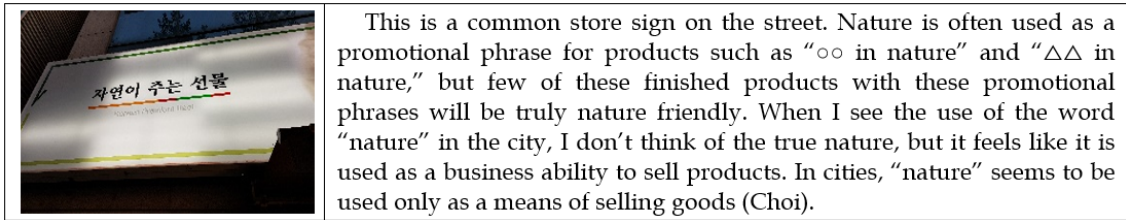


Figure 4. Business ability (phrase in picture is “a gift from nature”) (Source: Field study)

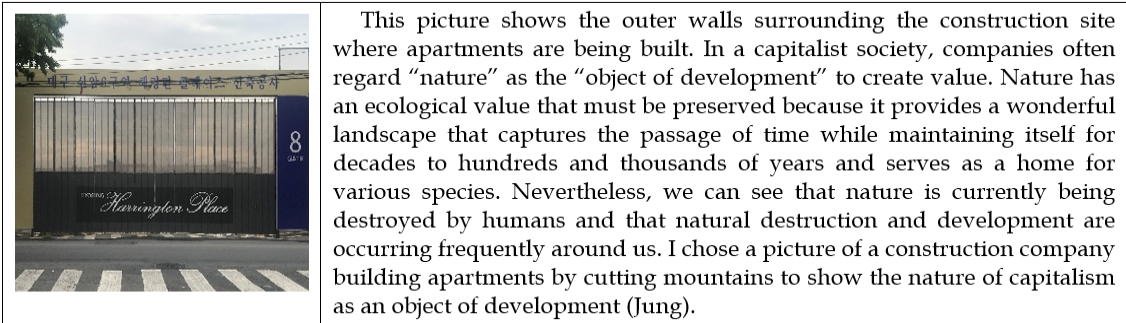


Figure 5. Construction site of an apartment building by cutting mountain (Source: Field study)

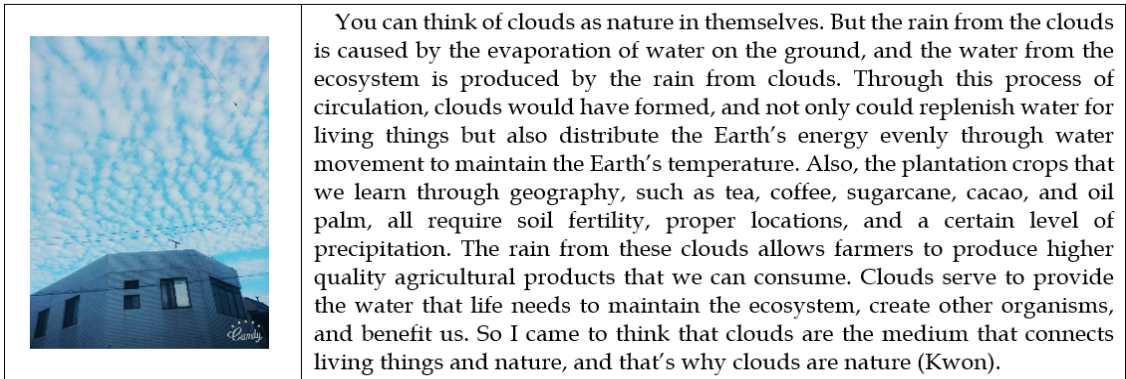


Figure 6. Clear clouds circulating through land & sky, where humans live (Source: Field study)

To depict this, one participant showed nature transformed into a large apartment complex for human residence and commercialized by human development (Figure 5). Other participants also suggested a number of cases, where unique natural scenery such as the volcanic topography of Jeju Island was commercialized, and the surrounding area was made into parking lots, accommodations, and consumption spaces for humans to use. They critically explored how natural landscapes are commercialized and operated for capital accumulation.

### Nature as Law of Things

As we saw earlier, one of the three perspectives on nature that Williams (1983) argued is “natural as the law of things.” As a law of things, nature is closely related to universal nature, which refers to the all-encompassing force controlling things in the world, that is, universal law or reality.

As pre-service geography teachers majoring in geography in university, participants are learning

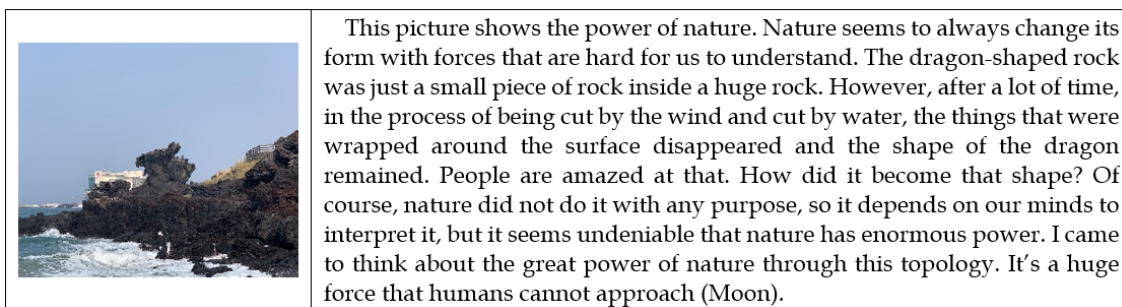
knowledge of the concepts, principles, and laws of geography. In previous studies, elementary and middle school students mainly represented nature as specific objects, whereas in this study, some participants represented nature as a law of things. They understood nature as a law rather than a concrete fact. One participant emphasized the principle of wind, saying

I feel very good when I take a walk in the city and feel a cool breeze. This wind is not artificially created. It’s not like I can feel the air because I want to, but I cannot not because I do not want to. We cannot defy the wind. The wind that is not artificial is irreversible nature.

Another participant focused on clouds as natural phenomenon, explaining the principle of cloud creation, saying,

clouds have various shapes and properties such as cumulonimbus and cirrus as a result of various actions such as evaporation and condensation (Figure 6).





**Figure 7.** Coastal erosion topography: Yongdu Rock in Jeju Island (Source: Field study)

Another participant captured the sun and moon, saying that it is the sun that shines brightly on us during the day, related to the solar calendar, and it is the moon that shines brightly on us during the night, related to the lunar calendar. Another participant compared nature to a clock, explaining the principles of day and night with natural phenomena created by nature, such as the rotation of the universe and the earth. Another participant noted the stars in the sky, saying that they brighten the dark night, and furthermore, are indicators of how much humans have destroyed nature by always keeping their place in the sky, the only place that humans have not been able to affect.

Another participant represented seasons as nature. She said,

the four seasons of spring, summer, fall, and winter, and the changes in nature, human life, and the natural environment according to the four seasons affect many things such as people's clothes, play culture, surrounding scenery, and lifestyle.

Another participant took a picture of cherry blossoms in full bloom on the campus under the title "Waiting: Flowers bloom and fall," adding,

The reason I thought nature was waiting is because we are waiting for our favorite season as the seasons circulate. Nature does not have only one form. Its appearance changes according to spring, summer, fall, and winter. The same is true of cities. Cherry blossom trees are in the city, but they bloom naturally during the cherry blossom season, not artificially. As such, flowers bloom and fall over time, and it is nature that cannot be resisted.

Under the title of "Differences in lifestyle according to seasonal change," another participant explained,

the reason why Koreans need various clothes according to the seasons is because of the natural environment of spring, summer, fall, and winter.

In this way, he explains the principle of four seasons in Korea: spring, summer, fall, and winter, and the

difference between vegetation and lifestyle (such as clothing, play culture, and the surrounding scenery).

While some participants represented nature as space and the sky, some explained the principles by which topology was created. One participant, along with a photo of a *taponi* formed in Mai Mountain in Korea, said,

This mountain is not artificially made by people, but literally naturally created "nature." Geography, which is my major, is largely divided into two areas: physical geography and human geography. Among them, physical geography is responsible for half of them. As the name of physical geography suggests, one of the important things in the geography I study is nature.

They additionally explained the principles by which this topology is formed as a part of nature. Under the title "Evidence of history," a participant, along with a photo of Jeju Island's columnar joint, said,

As it goes by, time leaves a lot in the world. Everything, tangible or intangible, permeates through time, and we learn the wisdom of life by learning it or its spirit. This photo is a columnar joint of Jeju Island, which was formed by volcanic activity in the past. Looking at this evidence, we learn and study the environment and the process of topography at the time.

Another participant explained the forces of nature and the erosion of waves, along with a photo of Yongdu Rock, which is so named because the basalt on the beach of Jeju Island appears as a dragon created by sea erosion (Figure 7).

Finally, some participants represented the law of gravity as nature. One participant posted a photo of a waterfall with the title "Entropy law," saying,

The waterfall reveals the direction of nature. In particular, droplets falling from top to bottom are sufficient to prove the entropy law that all matter and energy change in only one direction. Drops of water from the waterfalls fall into a stream of water. The stream gathers to form a lake. In other words, a lot of water droplets gather to form a lake. However, the water in the lake cannot be

returned to become individual droplets. Like direct current, natural phenomena occur only in one direction. I thought that the falling water droplets contrasted too much with humans who change according to the situation. Water droplets are part of nature, but humans are also part of nature. But the two are so different in terms of consistency. I looked back on myself to see if I lived a regular life like a drop of water.

As such, the participant emphasized that humans need to have the same consistency as nature. Another participant posted a photo of a fountain in the city under the title "Nature, gravity that humans cannot resist," adding,

in the city, people can see a lot of work, such as rising and falling water in the fountain, people walking and running, and working at work.

### **Nature as Relational Geographies**

Because environmental problems are not just problems that can be solved by science and technology but are fundamentally social and political problems, they should be dealt with politically, economically, and ecologically (Morgan, 2012). Scholars critical of the dichotomy of humans and nature (Castree, 1995; Smith, 1996; Swynedouw, 1999; Whatmore, 2002) argue for a dialectical relationship between society and nature, and researchers have recently attempted more relationship-oriented approaches to overcome the dichotomy between humans and nature. These relational geographies reflect a broader interest in ontology among geographers. Haraway (1992, p. 297) explains,

if the world exists for us as nature, this designates a kind of relationship, an achievement among many actors, not all of them human, not all of them organic, not all of them technological.

One influential source of the idea that nature and culture are inseparably "mixed up" is Latour's (2004) actor-network theory. Rejecting the traditional Enlightenment dichotomies between nature and culture, objects and subjects, people and machines, and material and imaginary, the actor-network theory argues that all elements of a network should be explained in the same symmetrical terms (Ginn & Demeritt, 2009). By extending agency to nonhumans, the actor-network theory challenges human exceptionalism and the long-standing dichotomies between social and natural sciences based on it. By rejecting human exceptionalism, the theory raises an important question about "how we of ethical communities are to be renegotiated on account of its heterogeneous, inter-corporal composition" (Whatmore, 2002, p. 166). This relationship-oriented approach is closely related to the restoration of relations between humans and nature (nonhuman), ecological

thinking, and holistic geography that considers humans to be a part of nature and the Anthropocene as a middle ground between nature and humans and more-than-human geographies.

Some participants represented ideal views of the relationship between humans and nature (nonhuman). They considered nature from an inter-relational point of view, where nature has a great influence on humans and that humans also have a great influence on nature. One participant said,

Nature provides us with a lot. For example, it gives us good air through trees and food. However, as science and technology develop, humans try to develop nature in one direction. In this process, buildings are built in a space, where plants can be planted, and many trees are cut down. For this reason, the number of plants that can absorb carbon dioxide decreases, accelerating global warming, and causing a lot of damage to humans due to the fine dust generated in places, where factories are built.

They emphasized the importance of relational thinking between humans and nature, saying that human development of nature causes natural disasters such as global warming and fine dust, which in turn affects humans. Another participant compared nature, destroyed by human development, and humans trying to leave this destroyed nature to a romantic relationship under the title "lover to leave." Furthermore, they argued that humans now paradoxically struggle to transform destroyed nature into parks just as one may hold onto a departing lover.

Some participants criticized anthropocentrism and showed humans' ecological thinking as a part of nature. Ecocentrism asserts that the separation between people and nature is false and that we are fundamentally part of nature; therefore, we should respect nature's limits and attempt to live in harmony with it. Indeed, some claim that ecological or environmental values have an equal or even superior status to human ones. In the context of discussions about appropriate scientific methodologies, Holling (1998) argued that particularly for the study of ecological systems, integrated or holistic perspectives are superior to those offered by traditional, reductionist science because nature is more than the sum of its parts (Haines-Young, 2009).

The participants' ideas point to the problem of simply separating humans from nature. Humans are part of nature and are members and products of complex ecosystems. Many people think of nature and humans separately, but some of the participants thought that human activities could become part of nature when they adapt to the existing environment and blend well. One participant compared nature to "on the way home" with photos taken at subway stops, saying that humans are



Nature is “on the way home.” A little excited step on the way home, a comfortable and cozy home, or sometimes a tired, weak step back. The road to home may come with different feelings from time to time, but the conclusion is always the process of returning to where I should be. Humans transform nature at will and find a way to coexist together, but in the end, humans have to live in with nature. As humans are also part of nature, I think we should constantly study ways for nature to exist as nature, as we have done so far (Yoon).

Figure 8. On the way home (Source: Field study)



Originally, nature was a peaceful place where animals and plants coexisted and lived together. Neither was the owner of nature, and they have lived in symbiosis with each other, flowing according to nature’s order. However, human greed has destroyed this natural order, and now it seems that humans reign over nature. However, when I saw a street cat lying down in a cozy place to lie down on the side of the city, I suddenly thought, “Humans made a city like this where animals such as street cats should naturally walk.” Many species have become endangered because of humans, and they are the main culprits in destroying animal habitats. It occurred to me that nature was a place where animals and plants could live safely without human interference (Lee).

Figure 9. A place, where animals can stay safely & comfortably (Source: Field study)

part of nature and nature is the home they live in (Figure 8). Another participant titled a photo of themselves “human beings are nature,” and said,

Nature is any existence or state that exists on its own or in the universe without adding human power in a dictionary sense. But I do not like this definition. I think that humans also exist as a part of nature, and human thinking and behavior are nature.

One participant said,

What often appears when examining the definition of nature is plants, animals, and other inanimate objects that arise and exist on their own without human power interfering. I doubted whether this was the right definition. I questioned whether it was right to interpret nature as a separate being from humans. If houses built by ants or bees are natural factors, human-built houses can also be nature, and I have concluded that humans are also animals in nature. I think it is wrong to see nature as separate from humans, as humans are also part of nature. I realized by chance that I have been thinking of humans and nature in a dichotomy. Nature is neither grand nor special. Nature is always living with our people wherever and whenever.

One participant presented a photo of a human living space in harmony with nature under the title of “nature that coexists with humans.” In other words, humans are just part of nature. As such, many participants said that humans and nature should be viewed as inseparable

rather than dichotomous and that humans can coexist with nature only when they exist as part of nature.

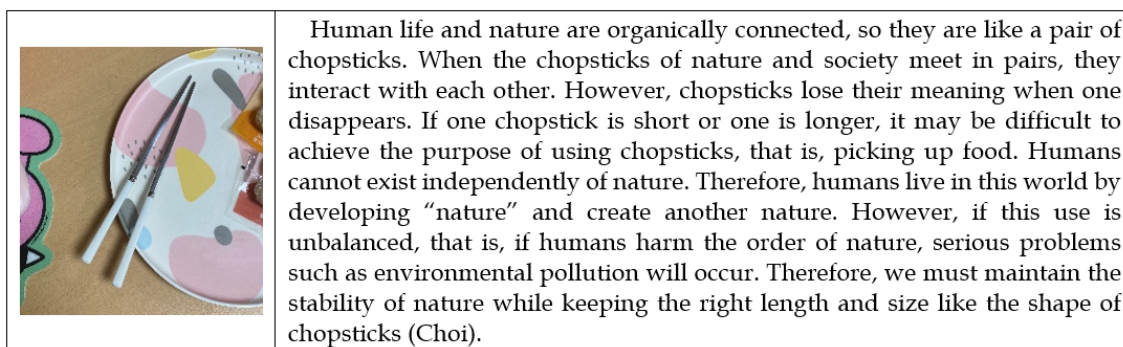
As humans destroy nature and build cities, there are animals that lose their original habitat and have difficulties adapting to the city. As nonhuman, these animals are social actors in the space of cities. Many participants represented the “more-than-human geographies” that considered these nonhuman animals part of nature, in particular street cats living with humans in the city (Figure 9), followed by pet dogs, raccoons that inhabited buildings in the absence of humans, and birds (doves, magpies, sparrows, crows, etc.). Under the title of “a street cat adapted to humans,” one participant said,

I think nature is like a street cat that has adapted to humans. I think nature is a creature that we must strive and continue to care for in order for us to live together, like a street cat that is wary at first, but has not refused human efforts and care.

Another participant represented more-than-human geography, under the title “earth living together” with a picture of crows sitting on a tree branch, saying,

I think it is nature that humans use the space of earth not only for humans but also animals and plants other than humans.

Meanwhile, some participants emphasized the importance of relational geographies by using symbols and metaphors such as boomerangs, scales, seesaws, and chopsticks for these inter-relational aspects of humans and nature (Figure 10).



Human life and nature are organically connected, so they are like a pair of chopsticks. When the chopsticks of nature and society meet in pairs, they interact with each other. However, chopsticks lose their meaning when one disappears. If one chopstick is short or one is longer, it may be difficult to achieve the purpose of using chopsticks, that is, picking up food. Humans cannot exist independently of nature. Therefore, humans live in this world by developing "nature" and create another nature. However, if this use is unbalanced, that is, if humans harm the order of nature, serious problems such as environmental pollution will occur. Therefore, we must maintain the stability of nature while keeping the right length and size like the shape of chopsticks (Choi).

Figure 10. Relationship between nature & humans is like a pair of chopsticks (Source: Field study)

### Nature as a Threatened Place

The conceptual separation between humans and nature is created by humans and is a product of long-term social development. The separation of humans and nature motivated humans not only to measure and quantify nature but also develop tools to manipulate and use nature. Human practices have a substantial impact on nature. Even by simply reviving nature, humans reproduce nature (Anderson, 2009).

In the 1970s and 1980s, the most important aspect of the debate about the social construction of nature was that it was uncritically unacceptable that environmental issues or geographical knowledge of relationship between humans and environment was value neutral (Demeritt, 1994, 2001, 2002; Ginn & Demeritt, 2009). According to Henderson and Waterstone (2009), all knowledge is inevitably produced by actors located in specific historical and geographical environments, which has significant impacts on the means of knowledge production and the types of knowledge produced. Seager (1993, p. 3) argues that the environmental crisis is not only a natural ecosystem crisis but also closely related to power, profit, and political debate. Therefore, to properly understand the environmental crisis, it is necessary to explore the ideologies, institutions, and practices that support the excessive exploitation of natural systems. Because the environment is not just a problem that can be solved by science and technology but fundamentally a social and political problem, environmental problems should be dealt with politically, economically, and ecologically (Morgan, 2012).

Some participants saw that environmental issues and problems are inseparable from the humans and society that form and create them. They had the political ecology perspective advocated by scholars such as Robbins (2004) and viewed land and other resources and environmental issues as part of an open system closely related to larger and more complex historical and political and economic situations rather than an independent and closed system. Some participants represented nature as environmental issues that are currently threatened by humans. Perhaps because they

experienced school education and media such as newspapers and TV, students had a high awareness of environmental issues and many participants in this study were well aware of "nature as a threatened nature" or "nature as a threatened other." Participants were aware of various environmental issues such as pollution and the damage and destruction of the natural environment, which are worsening because of human developments in science and technology. They suggested excessive development by humans, litter and rubbish, smog, etc. as the causes of environmental pollution, and they emphasized the need to preserve nature such as trees and forests to heal this environmental destruction.

Some participants preferred living in cities to rural areas and recognized nature as challenged in cities. Participants recognized that natural places in urban environments continue to be invaded by human living spaces and showed awareness of the need for natural safety and security. Some participants represented the destruction of nature with buildings, paved roads, and factories. They were aware of the dialectical relationship between humans and nature that if humans changed nature, changes in nature would result in changes in human life and that all human actions against nature would eventually affect them.

Under title of "limited nature," one participant said,

Without nature, humans cannot survive. But like bottled water, nature shrinks.

One participant said,

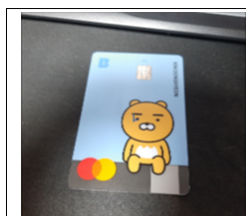
If urban construction is an innovation for humans, what does it mean for nature? Humans live conveniently in cities that have pushed nature away, but they also visit nature for relaxation.

Other participants warn of the threat to nature, comparing it to shopping baskets, sauces, traffic lights, non-locking faucets (Figure 11), mother-like beings, credit cards (Figure 12), and worn-out, perforated clothes. One participant compared nature to the "wound that must be treated" on our body, saying,



Nature in the city is like running water without turning off the tap. It is important to save water because it is an indispensable and limited resource for life. Nature is likewise home to numerous animals and plants and is closely related to human life, so nature cannot be excluded. However, humans are indiscriminately damaging nature to expand and develop cities. As humans destroy nature, major problems will occur in the ecosystems. In fact, even now, nature continues to die due to faucets that humans have not turned off, despite the problems that have been raised around the world (Ryu).

**Figure 11.** Non-locking faucet (Source: Field study)



I'm always happy to buy food or something I like using a credit card. I do not worry much about money when I use a card. Because you can pay if you just scratch it. Humanity developed and destroyed nature as if it were using a card. However, the moment we receive the card statement, we realize the reality. Nature is the same. We do not get paid for destroying nature in our generation. But our future generations will be paid for the nature we used. We must remember this point in using nature (Kong).

**Figure 12.** Nature seems to be very similar to cards (Source: Field study)

Nature has been damaged by our human reckless activities, so I think it is nature that has the wound that we humans have to treat again.

Another participant said,

The house, where everyone lives is nature. Whatever activities we do, we think it's like home because we live in nature. And I think people living on this planet have a sense of community, like a family living in one house.

One participant presented a picture of nature in a textbook titled "eternal homework" that we humans should solve, saying,

I thought that activities such as conservation measures and nature conservation in everyday life were permanent homework that humans must never forget and work harder to solve.

### Nature as a Necessity for Human Well-Being & Healing

Research reveals that environments can increase or reduce our stress, which in turn impacts our bodies (Smyth, 2005). Being in nature, or even viewing scenes of nature, reduces anger, fear, and stress and increases pleasant feelings. Exposure to nature not only makes you feel better emotionally, but it also contributes to your physical well-being, reducing blood pressure, heart rate, muscle tension, and the production of stress hormones. Humans sometimes leave complex cities and find rest in nature. Nature is a place of health, well-being, and healing for humans. Some participants knew that the natural environment, including trees and forests, was useful for removing human-induced environmental pollution. The concept that trees have the ability to clean the air suggests that these participants also perceived nature as essential for human well-being and healing.

One participant compared nature to "comfort" that is given to us humans, and another said under the title of "nature is a bench," that he thought of nature as a space, where one can relax in the daily life of a busy, complex, and desolate city. One participant said that the street trees and lakes in the city also provide relaxation and healing, and another said that nature is a resting place for the mind. One participant compared nature to a "home" and said,

I thought it was nature that made me feel comfortable and breathing just by looking at it.

Another participant said,

Nature is like a multivitamin that provides people with energy in all areas, including mental, physical, and economic. When people feel stuffy or tired in the city, they head to the mountains, rivers, or the sea. This is because looking at nature relieves stress and relieves frustration. Nature is like a multivitamin that powers all areas of our lives by supplementing nutrients throughout our bodies (Figure 13).

One participant said he thought nature was similar to a playground. Just as playgrounds provide children with comfort, fun, and play, nature relaxes our minds and entertains our eyes and ears, these days, the natural environment itself often becomes a playground (Figure 14). Another participant likened nature to bicycle storage, saying,

Bicycle storage is a place, where bicycles take a rest. Nature provides us with a resting place, just as bicycle storage is a resting place for bicycles. Nature also provides a resting place for humans, so I want to compare nature to bicycle storage.

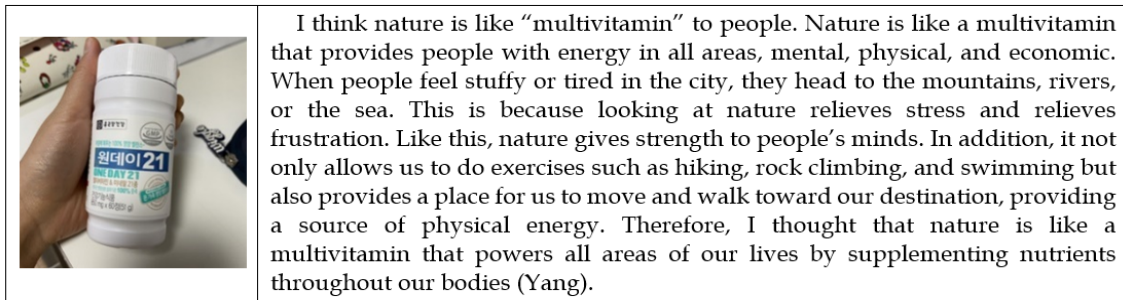


Figure 13. Nature is a multivitamin (Source: Field study)

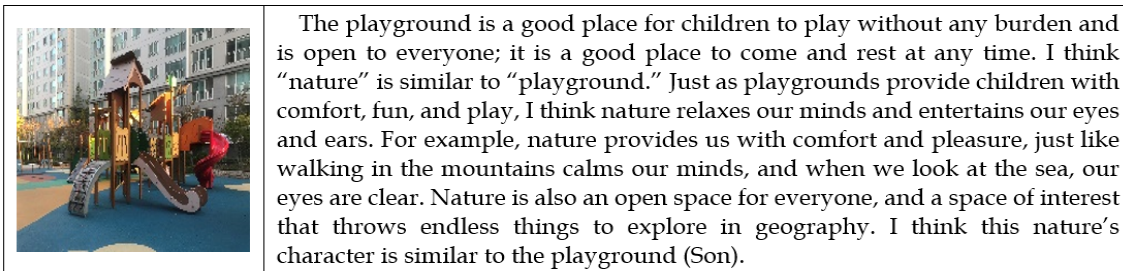


Figure 14. Nature is like a playground (Source: Field study)

## DISCUSSION

The meanings and definitions of nature are more than simply academic concerns; they have important implications for what you eat and how you live. Geography places more emphasis on nature than on other disciplines. In particular, unlike other disciplines and subjects, geography focuses more on nature in terms of the relationship between humans and nature, not nature itself. The concept of nature and its geography research combine physical and human geography into one integrated discipline (Castree, 2005; Ginn & Demeritt, 2009). Geography understands and studies nature as a concept and object (Ginn & Demeritt, 2009).

Nature is far from being “out there” and is “in here” with us in the way our bodies, our senses of ourselves, our world, and our daily lives are known by its various overlapping concepts. Exactly due to ubiquity of nature, such concepts are complex and often fiercely contested. Concepts of nature not only change over time but also vary from place to place (Ginn & Demeritt, 2009).

In that sense, broad conceptualizations of nature are very important task for geography instructors and learners. The research on how these students, including middle school students, perceive and understand nature is significant in that formative life experiences can be an important foundation for later active environmental concerns (Keliher, 1997). Students’ life experiences of the environment can play an important role in their developing an active concern for the environment (Tanner, 1980). In addition, understanding how students perceive nature can help educators provide meaningful learning experiences that create active environmental interest in students. Research that provides insight into students’ understanding of environmental issues can be

very important when educators plan environmental education experiences.

College students’ perceptions of nature and the environment are formed through their experiences and learning in earlier schools and might not change much without education interventions. Some participants are trapped in traditional and narrow thinking about nature (e.g., nature and human dichotomy and belief in pure nonhuman nature), while others have a broad level of nature (e.g., social nature, nature as a relational geography, nature as threatened places, nature as a place of well-being and healing). As participants have different levels of conception of nature, it is essential for participants with narrow conception of nature to educate them on various perspectives of nature in order to change narrow stereotypical images of nature. (Anderson & Moss, 1993; Keliher, 1997). Designed to better understand university students’ (precisely, pre-service geography teachers) perceptions of nature, we found that these students had a variety of perceptions of nature that could be related to their familiarity and experience with the environment; we also found that the level of awareness of such nature varied among participants, and we argue that formal education experiences can change alternative perceptions of their (natural) environment.

Until now, in the fields of geography and geography education, numerous questions have been raised about the dichotomy between humans and nature, emphasizing restoring relations between humans and nature. Nevertheless, no prompt solution has been offered. Earlier, Pepper (1985, p. 69) asked the question “Why teach physical geography?” and concluded that if there was no social purpose, there was no justification for teaching physical geography. He argued that

geography promotes uncritical, atomized, and functional approaches to the natural environment, which are very different from the socioeconomic context. He further criticized that physical geography has simply led to a model of science education that has failed to review the social context in which decision-making is made. Thus, since the late 1980s, the idea that society and nature can be separated has been heavily criticized.

Since the criticism of this dichotomy between humans and nature, many geography educators have regarded geography as an important method to teach environmental issues and have dealt with many issues to explore the relationship between humans and the environment. This is because environmental issues can reflect social contexts in the natural environment. However, according to radical geography educators such as Huckle (2002, 2009), school geography tends to provide a simple and unrealistic explanation of environmental issues and does not pay enough attention to the idea that nature is a social construction. For example, school geography describes environmental problems as a global problem, attributing them to overpopulation, resource shortages, lack of skills, overconsumption, and overproduction. This explanation fails to connect with various social backgrounds, where environmental issues arise.

At the stage of developing the Australian national curriculum, the geography curriculum advisory group agreed that geography should be reborn as a fully integrated subject, away from traditionally separating physical and human geography (McInerney et al., 2009). The members of the group were greatly influenced by environmental geography (Castree et al., 2009), which has recently been discussed in social science and geography, and the debate on the concept of "nature" (Castree, 2005). As a result, all units traditionally beginning with physical geography were converted to "environmental topics" including human use of nature, interaction with the environment, and cultural geography, and every unit that started with human geography also included environmental topics.

Recently, the term Anthropocene is spreading in various academic fields as humans experience various environmental and climate crises. The first implication of the anthropocene in geography and geography education is as a very important keyword in the establishment of the relationship between humans and nature. The geography of the Anthropocene challenges the dichotomy between man and nature. It seeks a transition from an anthropocentric to an eco-centric perspective, recognizing humans as being one with nature (Castree, 2015a, 2015b). In the future, it is none other than humans themselves whom humans will encounter in nature, and only nature will see the results of their actions revealed (Morgan, 2012). After all, the challenge given to geography education in the Anthropocene era is fostering relational, caring, or

holistic thinking between humans and nature, away from a human-centered perspective (Jackson, 2006; Massey, 2008; Rawding, 2014; Renshaw & Wood, 2001).

For elementary and middle school students to perceive these different perspectives on nature, changes in the perceptions of nature of college students who will become future geography teachers are preceded by changes in school geography. Usually, the school curriculum is conservative and lags behind in containing social change and academic development. In this situation, unprepared geography teachers who do not combine the different perspectives of nature may fail to make students perceive these perspectives. Therefore, this study is meaningful in providing researchers with important empirical evidence to plan future teaching and learning about nature to pre-service geography teachers.

## CONCLUSIONS

This study showed that pre-service geography teachers who participated in a photovoice project have different formulations and perceptions of nature. We showed that the different experiences of pre-service geography teachers could determine the complexity and consistency of their perceptual framework for nature. According to Keliher (1997), the meaning that students gave to the term nature seems to have been formed through media and school education, as well as nature they experienced in their daily lives. We believe that these school and external factors had various effects on the students' conceptions of nature. Further research is clearly needed to identify the images of nature contained in the university's geography introduction, including media and elementary and secondary geography textbooks, and to identify the source of some stereotypical images. Additionally, for pre-service geography teachers to cultivate recent reconceptualization about nature, instructors need to provide positive views of nature and the environment that can lead to active environmental concerns in consideration of well-formed perceptions of pre-service geography teachers; active experiences in nature seem particularly valuable. Geography education programs that encourage familiarity and responsibility with nature can be the key to changing perceptions that encourage active natural environmental concerns.

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