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Urban Public Space as a Didactic Platform: Raising Awareness of Climate Change through Experiencing Arts

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Abstract: This paper investigates the meanings of urban public space, both as a didactic platform and as a way to spread awareness of climate change through art. What are the roles of public space? How do artworks intervene in urban public space? How can public art contribute to "sustainability" issues? I have argued that the intervention of art in urban public space offers effective ways of developing climate change art, which is understood to be an educator. Public space can be categorized into three different types: everyday, social, and symbolic spaces. These can be used as a platform for opening discussion and learning about the increased issues of the global crisis in contemporary society. I have drawn upon the representative case studies about climate change to explore how they intervene in urban public space and how they engage viewers to spread awareness, which is one of the fundamental aspects of this paper. It also stimulates viewers' perceptions and awareness of a more sustainable future through phenomenological and emotional experiences. Thus, this paper contributes to the understanding and knowledge of the relationship between art and public space with respect to raising awareness about climate change and considering how art intervenes in urban public space to create an eco-didactic platform.

Keywords: climate change art; urban public space; experience; emotion; eco-didactic

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1. Introduction

In recent decades, global climate change has arguably become the most pressing socio-political issue. It raises awareness of the global crisis, which reinforces concern about environmental issues. Many scientists, geologists, sociologists, activists, and policy-makers have already tried to promote environmental protection [1]. However, "this task no longer solely belongs to science" [2]. Instead, contemporary arts and related areas also need to endeavor to make an effort. In this sense, the role of art has been rising in significance with regard to climate change. How can contemporary art spread awareness of climate change? Art can influence people's understanding of the climate crisis, providing social learning, emotion, and engagement [3]. Many contemporary artists, such as Olafur Eliasson and Eve Mosher, have already created a range of innovative projects that engage the audience in climate change. Art can raise awareness and hypothesize how people can challenge climate change and create a more sustainable future for all of us. Artists can shape conversations about the environment and the artwork itself can "challenge and be provocative, both informing and opening our minds" [4]. Bill McKibben (2005), an American environmentalist, emphasizes the role of the artist, stating that:

"[a]n intellectual understanding of the scientific facts was not enough–if we wanted to move forward and effect meaningful change, we needed to engage the other side of our brains [. . .] the people best suited to help us do that, he believed, were the artists" [5].

This means that art does not provide a solution, but can create a personal connection to climate change that can stimulate individual perceptions and awareness [6] (p. 2). Artists and those involved in related areas can deliver messages about climate change, which will help to shape our values and behavior with regard to a sustainable future. In Korea,

however, after President Moon Jae-in pledged that the country would go carbon neutral by 2050 during a speech to the national assembly [7], climate change became a significant social issue in Korea. However, this issue is regarded as an area for which scientists and politicians should be responsible. Korea mainly focuses on policies and scientific solutions rather than on social and artistic approaches. Moreover, climate change is rarely discussed among the public. Bringing the issue of climate change to the forefront of public debate is extremely important. Individuals should be aware of the global crisis and make efforts to change their behaviors and consider what they can do for future generations "because we all produce a certain amount of greenhouse gases" [8]. Melissa Denchak refers to Aliya Haq's words, stating that "[c]hange only happens when individuals take action [. . .] There is no other way if it does not start with people" [9].

Nevertheless, some contemporary practitioners, including artists, designers, architects, and activists' groups, deal with the climate change, global warming and sea level rise that we face. Their artworks are presented using various methods, including traditional media, new media, and social forms, such as art-activism or participatory art. For example, Zaria Forman's (2016–2017) pastel drawings of a series of glaciers convey the urgency of climate change, allowing viewers to connect with Antarctica and stimulating their emotional behavior. Lines (57°59′N, 7°16′W) (2018–2019), created by Finnish artists Pekka Niittyvirta and Timo Aho, is a light installation using a luminous line to show the result of the sea level rise due to global warming. Niittyvirta and Aho state that "the work provokes a dialogue on how the rising sea levels will affect coastal areas, inhabitants, and land usages in the future" [10]. Daniel Crawford (2015) creates music, for example Planetary Bands, Warming World, using scientific data (i.e., temperature data) to inform how the Earth's temperature has risen over the past one hundred years. Moreover, Gideon Mendel's (2007–present) Drowning World presents an exploration of the extreme effects of climate change "in an intimate way, taking us beyond faceless statistics and into the individual experience of its victims" [11] (p. 219). Some artists' works are very abstract, stimulating individual awareness and perception through emotional experience or feelings, while some other artworks emphasize engaging with scientific data or technology to provide information about reality. Moreover, some artists allow other people, such as viewers, residents, and the community, to participate in their works. They have the power to educate through social engagement, stimulate viewers' emotions and inspire them to change their behavior [12]. What is the role of art in climate change? Can art in climate change have an impact on viewers? Art provides a personal connection to communication through sensory and conceptual means [11] (p. 29). Sacha Jérôme Kagan (2014) states that "art connects people on an emotional level, and as a result, is a very fitting way to bring attention to critical issues" [13]. In relation to this, David Buckland (2013) argues that "art has the power to move people" [14] and articulates social and emotional aspects through individual experiences. This is a distinctive aspect, compared with what scientists and governments do. It will be a powerful yet poetic force to make individuals change their behavior and attitudes towards our environment. In relation to this, I focus on the work of John Dewey and Miwon Kwon, which provides a conceptual framework on which to build this paper. These theorists are significant when exploring the ideas of phenomenological experiences in order to gain an understanding of the effect of arts and public space on changes of behavior.

Contemporary art stimulates artists to engage the public area as a platform in order to inform a broader audience about ideas and concepts relating to the environment. Public spaces are places that anyone can physically and visually access [15,16] and social spaces used for various activities [17–19]. This means that public space is in the realm of residents' everyday lives and can be a didactic platform by gathering, communicating, and debating social, political, and environmental issues. In particular, artworks in public spaces convey their message to a broader audience. This public art "encourages widespread dialogues, and the dissemination of knowledge" [2]. It means that public art enables people to be immersive and share personal experiences with others, stimulating changes in their

behaviors. This is why art should intervene in urban public space as an effective eco-didactic platform.

Thus, this paper investigates several key issues, particularly public space, art, climate change, and education, to explore how contemporary art and urban public space combine to spread awareness of climate change. This does not mean investigating climate change art by analyzing artists and art theories, but instead exploring the role of public space and its interrelationship with art, climate change, and education. It also asks several questions. How does art intervene in public space? How does art communicate with the public to deliver its potential message about the climate crisis? What are the effects of climate change art? Thus, this paper aims to examine how urban space can provide a distinctive and impactful approach, engaging with the art to raise awareness and help to communicate the level of climate change that we face. For this, I investigate:

1. the meaning and the roles of climate change art;
2. the concept and roles of public space in a contemporary urban context;
3. case studies, through analyzing the selected climate change arts; and
4. ways of using urban public space as an effective educational platform for climate change art and discussing its effects.

Thus, this paper attempts to analyze various characteristics of urban public space and its use as a didactic platform to spread awareness of climate change, through the use of selected case studies of climate change art that are presented to the public in various ways. This will present ways in which art in urban public realms can contribute to our sustainable future.

2. Art, Climate Change, and Urban Public Space

2.1. Climate Change Art

In recent decades, climate change and related themes have been rising in the art world. Moreover, the role of artworks is increasing substantially due to their potential power for raising awareness and helping to educate a broader public. This is because art can generate social discourse through conveying information about climate change in novel ways [20]. Many practitioners, such as artists, designers, architects, and activist's groups, consider climate change and its related themes; this is defined as "climate change art". The term "climate change art" here refers to artworks that deal with the direct issues of climate change, such as global warming, sea level rise, and melting glaciers.

Climate change art encompasses diverse approaches, including traditional media, installations, performance, art-activism, and social sculptures. Climate change art often engages scientific data and technology to convey the reality of the climate changes we face, creating aesthetic and interactive practices. Climate change art could be interchangeable with expressions such as "environment art" or "ecological art" in terms of dealing with environmental issues [11] (p. 34) and "information art" or "data art" as they blend with technology and scientific data. It also emphasizes participatory, community-based approaches, where the audience members become collaborators or performers [12] (p. 659). Thus, climate change art can be understood as interdisciplinary, because artists embrace ideas from science, philosophy, technology, and the community. In particular, climate change art is a contemporary movement that focuses on climate change, with an emphasis on being eco-didactic. Amanda Gorsegner (2016) states that "the integration of art with science, communities, technology, and activism has brought awareness to the role of art to engage individuals" with climate change [6] (p. 13).

The fundamental basis of climate change art is its pedagogical or didactic aspects. Climate change art is intended to raise awareness, provoke dialogue, and encourage long-term respect for our environment.

Through using art as a medium, artists present our past, present, and future environment, using various methods, forms, and contexts, such as considering how humans impact our environment and how changing humans' behavior could change our future. They also concentrate on emotional experience, providing feelings of fear. For example,

Pekka Niittyvirta deals with sea level rise due to global warming, allowing viewers to experience the reality of an anticipated future in a local context. Daniel Crawford creates music by using scientific data (i.e., temperature data) to inform viewers of how the Earth's temperature has risen over the past one hundred years. These works stimulate viewers' emotional and sensory experiences, presenting how humans have an impact on global warming. In this sense, Sandrine Simon (2006) expresses that these artists' works can "emotionally shake their public" [3] (p. 148). Eve Mosher also intends to provide a feeling of fear to residents, allowing them to realize the future seawater line. There is a didactic aspect here. This means that climate change art can be understood as an "educator", through using emotional experience. It triggers a change in viewers' behavior that leads to action [13]. In other words, climate change art can affect the viewer's perception, giving them ideas for change [21] through immersive and emotional experiences. Table 1 shows key aspects of climate change art.

Table 1. Characteristics of climate change art. Source: Author's drawing.

Classifications	Contents
Definition	Artworks that deal with a direct issue of climate change (i.e., global warming, sea level rise, melting glaciers, etc.)
Medium	• Traditional media • New media • Social forms, such as art-activism, participatory art, and community-based art
Methods	• Artwork itself • Engaging science or technology • Social engagement
Characteristics	• **Pedagogical Aspect**: Climate change art conveys humankind's impact on the Earth to the public through different mediums. • **Emotional Experience**: Climate change art provides emotional experience through feelings of fear and hopefulness. • **Collaboration/Participation**: Climate change art engages viewers, scientists and the local community.

2.2. Urban Public Space

Contemporary art stimulates artists to engage with the public space to bring issues concerning our environment to a broader audience. What is public space? Public space is an "essentially contested concept" [22] (p. 480). However, public space should be understood as having social, physical, and environmental aspects within a contemporary urban context. Public space should be a significant element within a city and a significant stage that allows residents to engage in outdoor activities in a contemporary context [23]. This means that public space is an open and accessible space for all people.

There are already many discussions regarding the concept of public space by geographers, sociologists, and theorists. According to Cambridge Dictionary (2021), "public" means; "(a) an open space, including public parks, toilets and transport, which are for everyone to use; (b) connected with ordinary people; and c) all of the ordinary people" [24]. This shows that "public" does not only indicate a physical area, but also includes social relations and spatial usages. In relation to this, UNESCO states that "a public space refers to an area or place that is open and accessible to all peoples, regardless of gender, race, ethnicity, age, or socio-economic level. These are public gathering spaces such as plazas, squares, and parks and connecting spaces, such as sidewalks and streets" [25]. Public space is recognized as being accessible to all groups and provides social action and tempo-

rary ownership [17,26,27]. This means that public space refers to the physical features of openness and a socially created place to communicate with other people and environments.

Urban public space is an intermediary space that a large number of unspecified people can easily access, connected with various urban elements [15]. It is also a social space [28], where contemporary issues are discussed and social values are established by the public, where they can interact with environments, architecture, facilities, and other people. According to Jürgen Habermas (1989), the public space is a shared space where people come together to discuss and identify social issues [17]. He also argues that the origins of public space derived from the form of the salon or agora. The salon and agora were forums for discussions, exchanging opinions, and living together [28]. In Korea, public space, such as squares or streets, has historically been used as a social space, where people gather, discuss, and share in order to respond to social and political issues [29]. According to political theorist Iris Marion Young (1990), a public space is an accessible space in which anyone can "both participate and witness" [30]. This demonstrates that public space is a good arena for a didactic platform in which to engage people and generate communication. The public sphere is a "realm of our social life in which something approaching public opinion can be formed" [31], providing that the public space is not only a simple outdoor space, but also a social space, where social values are formed and where people can communicate. It represents physical and social aspects, such as accessibility and sociality. This notion of the public space becomes evident in terms such as communication, opinion, and social value.

At this point, this paper considers how the realms of public space can be defined in a contemporary urban context. Urban space can be categorized by both private and public realms; in the former, ownership belongs to an individual, while in the latter, ownership, such as roads or public rights, belongs to public institutions. Hannah Arendt (1998) states that the public space is "common to all of us and distinguished from our privately owned place on it" [32]. This does not mean that public space is always open and private space is necessarily closed [33]. In other words, both public and private areas can be physically open or closed. For example, some public spaces, such as a protected area, cannot always be accessed by the public [34], while some private spaces, such as squares in the COEX Mall in Seoul and the Rockefeller Centre in New York, are open to everyone and have a public character. This allows public spaces to expand into privately-owned areas. This shows that urban public space should be discussed with regard to the spatial usages of people rather than its ownership or physical forms. In this sense, Rob Krier (2015) defines the public space "as open, unobstructed space [used] for movement in [the] open air, with [the] public, semipublic, and private zones" [35] and also describes it as a space between buildings in towns. This means that public space needs to be interpreted with regard to urban elements, such as buildings and shopping malls, in a contemporary urban context. In other words, architecture, as a visible space, is a substantial element with which to compose a contemporary urban landscape. Although a number of buildings have private ownership, the surface, in particular the façade, visually engages people. For example, due to the use of technology, some buildings are already used as a medium for visual arts or advertisements in order to engage the public. In this sense, Jeong Hye Kim (2019) states that when we experience these spaces, it is the exterior or the façade of the building that we experience; we do not experience what is going on inside [29] (pp. 121–122). This shows that the façades of architecture can also be categorized as a public realm in a contemporary urban context. Moreover, landmarks, such as the Seoul Tower, The Shard in London, and the Empire State Building in New York, are also understood as part of the public realm in their relationship with the public. These show that both open realms inside buildings, and the façade can be categorized as an urban public space, as they are used for the public. They can also create symbolic images of the city. Thus, public space in a metropolitan area such as Seoul needs to be understood more broadly: it is understood by physical, visual, and symbolic access. The visual and symbolic access to public spaces is significant, "in that the possibility of access should also be easily perceived, and symbolic cues, communicate

which users and uses are acceptable" [36]. This way of understanding public space can be developed by looking at public interest or spatial usages. The public interest here refers to a relative concept, and this can vary depending on the values of members of society. Public space in an urban context creates a framework for encouraging the public to engage with art, providing potential possibilities for urban life. This will also contribute to the integration of policy and regulations related to the use of public space in Seoul. Thus, the realms of contemporary urban public space are as follows.

As shown in Figure 1, urban public space can be categorized into three areas: (a) an everyday realm, such as streets; (b) a social space, such as a square, park, or shopping mall; and (c) a visual/symbolic space, such as the façade of a landmark (see Figure 1). Based on this categorization, this paper, through analyzing case studies, will investigate how art effectively intervenes in these urban public spaces and study how effective it is at spreading awareness of climate change.

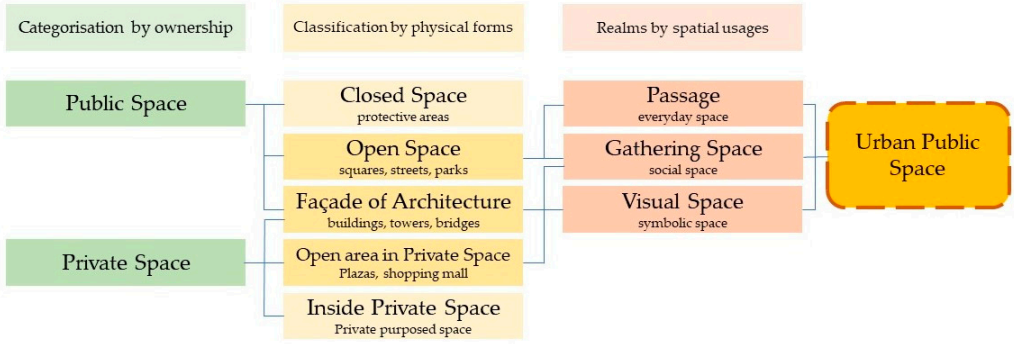

Figure 1. The realms of urban public space. Source: author's drawing.

3. Climate Change Art in an Urban Context: A Review

Global climate change is likely to be significant in Korea, including global warming and sea level rise, but implementing climate change art is still at an early stage. Therefore, due to the limited amount of climate change art in urban public space in Korea, it is worth looking at art projects, focusing on the usages of urban public space, related to a global crisis. The project review covers not only domestic, but also international public art projects. For the case study, I have selected prominent climate change art and analyzed how the art intervenes in the urban public space for eco-didactic purposes.

3.1. Olafur Eliasson's Ice Watch (2014, 2015, and 2018)

Olafur Eliasson's Ice Watch is a well-known example of climate change art. He deals with several key issues, such as materiality, time-based work, and phenomenology in global warming. Eliasson displayed twelve ice blocks that had broken off from Iceland's largest glacier, Vatnajökull [37], in a prominent public space in order to raise awareness about the urgency of climate change. He emphasises viewers' phenomenological experience of the drama of watching a melting glacier in real time. Ice Watch has been exhibited in squares in several cities, such as City Hall Square in Copenhagen (2014), to mark the publication of the UN IPCC's Fifth Assessment Report on Climate Change, Place du Panthéon in Paris (2015) on the occasion of the UN Climate Conference COP21, and two locations in London (2018) (outside Bloomberg's European headquarters and in front of the Tate Modern) [38].

Ice Watch makes invisible climate change effects visible, providing a phenomenological experience: it emphasizes viewers' participation (see Figure 2). This ice sculpture is used to raise "awareness of the human impact on global warming [. . .] Ice Watch is less about the ice than about the spectator's watch" [37]. It allows the viewer to observe the melting process of the glacier by human actions, allowing them to recognize it for themselves and ask questions about the climate crisis, which raises hope for a better future.

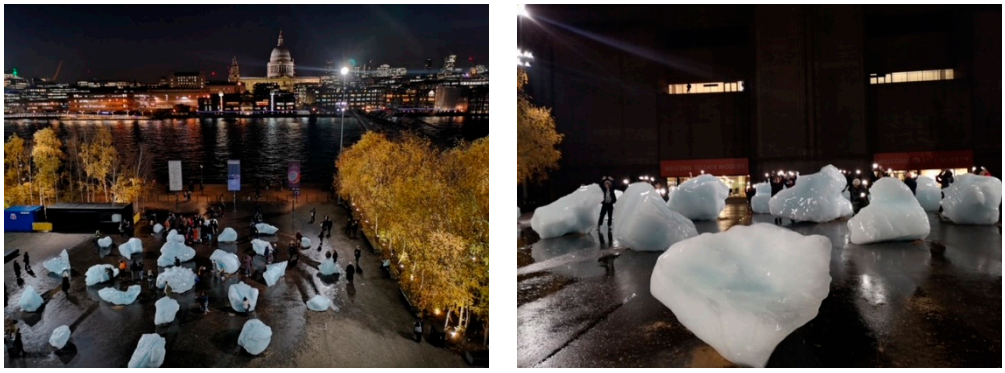

Figure 2. Olafur Eliasson, Ice Watch, London, 2018. (Olafur Eliasson, Ice Watch, 2018, Source: Author's Photography).

A number of people visit the area to watch Ice Watch, touching them and sharing images of people hugging or kissing on social media. This installation makes an invisible future image, in which ice will have disappeared, visible. Eliasson brings the melting ice to people, and "the impact of the installation [. . .] will allow people to see the effects of climate change, which are otherwise invisible or unknowable" [37] (p. 65). Ice Watch stimulates the viewers' awareness of their environment and their position as phenomenological subjects within it.

3.2. Daan Roosegaarde's Waterlicht Westervoort (2015–present)

Daan Roosegaarde deals with the interrelationship between scientific technology, art, space, and people. Roosegaarde produces Waterlicht using blue LEDs and lenses to create a virtual flood, influenced by rain and wind, while contemplating the future (see Figure 3). He engages with designers and engineers to merge technology and art. This work has been exhibited in various cities, such as Amsterdam, London, Paris, and New York, since 2015. Waterlicht raises awareness about rising water levels due to global warming. This work expresses the enormous power and poetry of water. It simulates "what it would look like if the Netherlands's dikes did not exist, and the complete country was flooded in order to raise awareness about the power of water" [39]. Waterlicht allows viewers to have a sensory experience of a virtual flood. It triggers them to pay attention to the human impact on the environment, which causes sea level rise. It transforms squares into an airy dream-like landscape.

(**a**) (**b**)

Figure 3. (**a**) Daan Roosegaarde, Waterlicht, Amsterdam. 2015. (**b**) Daan Roosegaarde, Waterlicht, Schokland. 2015. (Daan Roosegaarde, Waterlicht, 2015, Source: https://www.studioroosegaarde.net/project/waterlicht (accessed on 27 December 2020), image by Pim Hendriksen).

The London installation (2018) was enhanced by a soundtrack of music and Roosegaarde's narration of the installation [39]. Roosegaarde has produced a short video of Waterlicht, although it is impossible to present the physical, visual, and emotional experience without someone actually being there.

3.3. Namsan Seoul Tower (2011–present)

The Namsan Seoul Tower project uses scientific data that is converted into visual images and presents it through colored lights in order to inform people about the current level of pollution caused by micro dust in real time (see Figure 4). This work directly by stimulating the behavior of Seoul residents, as it lets them know whether or not they have to wear masks. In the last few years, micro dust has been increasing and is now seen as a significant issue that affects Korean everyday life. According to the Ministry of Environment in Korea, micro dust (or fine dust) is a phenomenon that occurs in Korea and neighboring countries due to climate change. As the polar glaciers melt due to global warming, the temperature difference between the polar regions and the Eurasian continent decreases. As a result, the north-west monsoon weakens, causing atmospheric congestion on the Korean Peninsula. When the north-west monsoon blows strongly, micro dust will fly to the East Sea, but if greenhouse gas emissions remain the same as they are now, the occurrence of high concentrations of micro dust will inevitably increase in Korea [40]. According to the BBC News, Koreans are growing increasingly concerned about the effects that the micro dust has on their health. as air pollution was causing them physical or psychological pain [41].

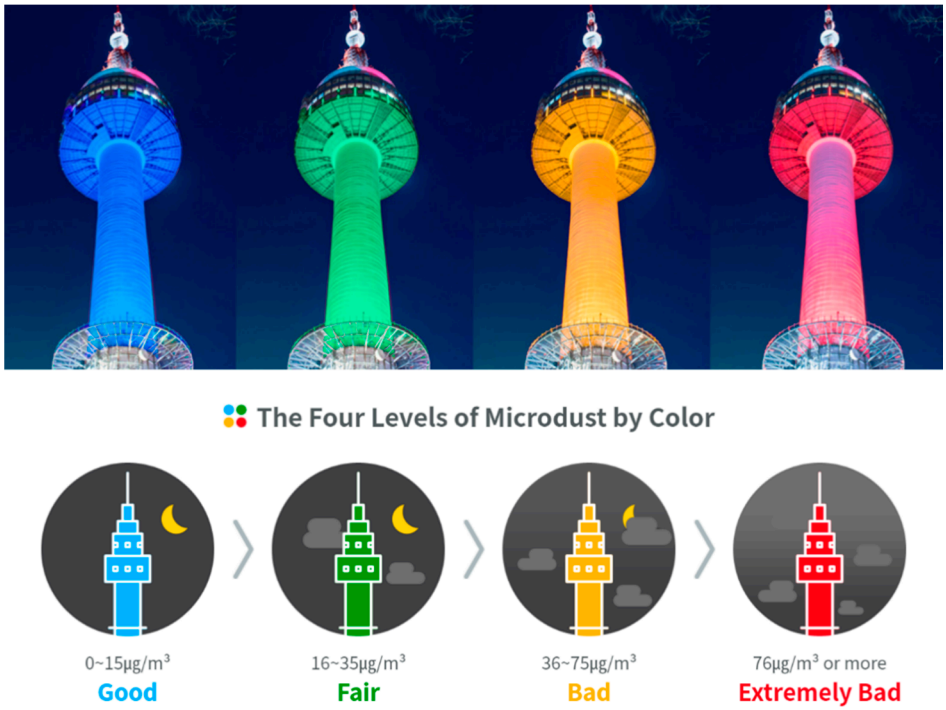

Figure 4. Seoul City Council, The Secret of Namsan Seoul Tower Illuminations: Four Levels of Micro Dust by Color, 2011–present. (Seoul City Council, 2011–present, Source: https://www.seoultower.co.kr/en//tour/tower_light (accessed on 27 December 2020)).

This work, however, is organized by Seoul City Council, engaging with Seoul's historically symbolic architecture, Namsan Seoul Tower, and scientific data. According to the TM coordinate method, Seoul's urban air monitoring network is installed across Seoul at about 5 km horizontally and vertically. It is mainly designed in this way to avoid directly detecting the measurement of mobile pollutants (vehicles), which are significant sources of air pollutants in large cities. It is located at a point that keeps a certain distance from the road and is generally installed on the rooftops of town halls and government offices. For this, Seoul Council installed 25 measuring stations in Seoul [42]. The measurements also connect to mobile apps, such as *misemise* (literally means micro dust), and people can easily access the level of air pollution in real time.

Colored lights cover the surface of the Tower to indicate the level of air pollution and micro dust, so that the information can quickly and easily reach the public. The lights are blue on clear days, but red when the air pollution level is high or a micro dust warning has been issued [43]. When the Tower lights are red, people should refrain from outdoor activities and wear a face mask if they need to go outside. This work provides information about the level of air pollution, transforming scientific figures into visual form, which affects residents' behavior directly within their everyday life.

3.4. Mosher's High Water Line (2007, 2013, and 2014)

Like Daan Roosegaarde, Eve Mosher also deals with sea level rises due to global warming. However, Eve Mosher's High Water Line presents a social form of art-activism, which is at the intersection of arts, culture, and environmental sustainability (see Figure 5). Mosher uses "a sports field chalk marker to draw a blue 'high water' line around Manhattan and Brooklyn" [44], showing the anticipated high water line of the city in a local context.

(**a**) (**b**)

Figure 5. (**a**) Eve Mosher, High Water Line, New York. 2007. (**b**) Eve Mosher, High Water Line, Santa Cruz. 2018. (Eve Mosher, High Water Line, 2007, Source: https://www.evemosher.com/highwaterline (accessed on 27 December 2020)).

She uses scientific data, such as topographic maps, satellite images, and research from NASA's Goddard Institute for Space Studies at Columbia University. Then, using a heavy hitter, she walks around 70 miles of the New York coastline [44], drawing a blue chalk line on the ground ten feet above sea level. This project allowed her to engage with diverse groups of residents and workshops, and also drew the attention of education booklets and a website, which were also an integral part of her project: they provide the alarming, scary, and sad realities of climate change [45,46]. Although this project was a singular act of walking by her, it was also a powerful form of art-activism in the public realm, giving an example of bringing art directly to the community instead of expecting the community to come to the artworks. This allows artists to be social actors or performers and creates radical emotion and imagination.

4. Analysis and Discussion

4.1. Analysis of the Project's Review

The case studies that are discussed above engage different realms of urban public space. These can be categorized into three types, which are:

(a) The use of gathering space, such as squares or parks: Olafur Eliasson's Ice Watch and Daan Roosegaarde's Waterlicht are exhibited in such a social space where people can gather, experience, and communicate. They present a poetic sculpture or installation to show melting glaciers and rising sea levels, respectively, emphasizing phenomenological and emotional experience;

(b) The use of symbolic architecture (or landmark): The Namsan Seoul Tower project uses an architecture medium for an art project. It converts scientific data into visual images

that inform people of the local level of air pollution, which affects viewers' behaviors directly, as it tells them whether or not they should wear face masks;

(c) The use of an everyday realm, such as the streets: Eve Mosher's High Water Line presents a social form of art-activism, and it brings the work directly to residents in the realms of their everyday life. People can see her performance by chance anywhere in the city and can communicate about the issue of global warming through her project.

4.1.1. Social Space

Ice Watch and Waterlicht were exhibited in prominent public squares, such as the Panthéon Square in Paris, the square in front of the Tate Modern in London, Museumplein Square in Amsterdam, and Granary Square in London, all of which are understood to be social spaces in which a number of people can gather and share their experiences. In this sense, there are two audiences in public art; one is the visitors and the other is the passers–by. For example, some people visit the area to see the artwork in the same way that they would visit a gallery or museum, while others pass by and accidentally experience the work. In this sense, Hayley Newman (2007) refers to "rubbernecking" as the act of someone slowing down, straining to look, curious as to what is going on [47]. It means that artworks increasingly recognize this involvement, triggered by the intervention into public space. It also recognizes that the artworks have to be able to communicate with the audience through phenomenological and emotional experiences. Both of these installations emphasize immersive experiences, stimulating viewers' emotions and creating awareness and perception. This means that people experience places through feelings and actions in relation to climate change art.

As a social space, a square has a particular concept of communication, allowing people to interact with elements of public space and share with others. For example, a number of people visited the area to watch Ice Watch, touching them and sharing images of people hugging or kissing on social media. In this sense, the squares become participatory landscapes. Through human action, visual involvement, and the attachment of values, people are directly involved in the artwork and public space [48]. Through experiencing the artwork, people could observe and talk to each other and become part of the life of the city by becoming users of the space. Moreover, this realm provides a particular placeness; it forms a social identity, creates memories of places, and connects the past, present, and the future. Artworks also provide an aesthetic aspect and transform the square into a gallery or museum space. This emphasizes the symbolism of the public space, improving social identity and the image of the city.

4.1.2. Symbolic Architectures

The Tower is regarded as a symbol of Seoul by both residents and visitors. The Tower sits on the Namsan mountain (243 m) so that it can be seen everywhere in Seoul. This means that people can experience it without needing physical access; it is understood to be a visual or symbolic space. The project has the potential power to convey a message by engaging symbolic architecture and creating a level of symbolism. There are two aspects of this project. First, it informs the broader public of the level of air pollution caused by micro dust through using colored lights to interpret scientific data in real time. In this sense, people can see the Tower from anywhere in the city and easily understand the air pollution data through visual experience. Most climate change art presents future images, warning of how the future will be affected by global warming. However, this provides information about the current air pollution situation, which has already been affected due to global warming, and impacts on the viewers' daily life directly. Second, it forms the image of the city, creating work that is both symbolic and aesthetic. Namsan Seoul Tower is renowned as the representative national landmark. Similarly, Andrea Polli's Particle Falls also engages buildings in order to visualize small particulate matter air pollution. She uses both symbolic architecture, similar to Namsan Seoul Tower, and historically significant, yet abandoned, buildings to help them to recover their symbolism. These buildings with

visual artworks become more easily identifiable and are therefore more likely to be seen as significant and to contribute to the imageability of cities. Lynch's term "imageability" "gives it a high probability of evoking a strong image in any given observer" [49] (p. 9). When a tower has a dominant physical characteristic, it can become a landmark in a city and play a role in the urban landscape [50]. Buildings should also be able to provide a memorable image, related to the city. Artistic engagement with architecture can contribute to building cultural images and giving places a new identity of their places [51]. Moreover, art also provides aesthetic and visual significance through the beauty of the artwork and contributes to improving the quality of the urban environment by considering the form and space of architecture. The aesthetic element and the value element, which are the characteristics of art history, can be derived as artistry. Moreover, landmarks or significant pieces of architecture in an urban space can improve the symbolic value of the city, which influences the image of the city beyond the art itself.

4.1.3. Everyday Space

Eve Mosher's High Water Line brings her project to people's everyday realms. Squares and architecture themselves are already prominent and symbolic places, where a number of people gather to communicate in a social environment. However, Mosher's project can be found throughout the realms of everyday life in the city. People can see Mosher's performance anywhere, such as the streets where they walk every day or in front of the shops that they go to in the city. Residents can be involved through participating and experiencing and also by communicating about the way that they have experienced it.

Everydayness is a substantial aspect of Mosher's work. This means that the realms of her project are an extension of personal domestic space in an urban context and an integrated space where independent living spaces intersect and coexist, creating a personal and social identity [15] (p. 74). Her project encourages people to communicate, interact, and raise awareness about sea level rises in urban life. Mosher's project exists where we live, work, and spend our leisure time: "even if we do not pay any attention to it, daily contact influences our attitude towards conserving the work and our intellectual and sensory appropriation" [52] (p. 86). This means that it can bring people to art and bring art to the people within the realm of everyday life. "This daily contact should preferably take place in an aesthetically pleasing urban environment" [52] (p. 93). Everyday space can be transformed into an extraordinary space, providing communication, debates, and experience. In this sense, Antoni Remesar (2000) states that "we encounter works of art every day as we walk around in cities that we tolerate but do not always understand" [52] (p. 86). This local social engagement has been described as "the most consistent and significant source of attachment to place" [53,54]. This placeness makes it possible for the public space to create a local identity and allows a wide range of social interactions. Local identity means the social, physical, and historical contexts of public space in a particular region, creating a sense of culture and psychological stability by sharing common values and goals. This means that public space can be considered as a medium that can be used as a form of education through engaging with the arts.

I have discussed the effects and methods of climate change art according to three types of urban public space. Although the methods are different and engage a different type of public space, their artwork aims to raise awareness of climate change as a broader issue. Climate change art engages with its audiences and creates spaces within which people can identify themselves by creating a renewed reflection on their community, on the uses of public spaces, or on their behavior [55]. This means that artworks make urban public space active and provide a multisensory experience, engaging "people on the streets about the increased corporatization of the public sphere" [17]. The characteristics of climate change arts in urban public spaces through analyzing case studies are as follows (see Table 2).

Table 2. Characteristics of climate change art in urban public space. Source: Author's drawing.

	Olafur Eliasson's ***Ice Watch***	**Daan Roosegaarde'** ***Waterlicht***	**Namsan Seoul Tower Project**	**Eve Mosher's** ***High Water Line***
Audience	**Visitors and passers-by**	**Visitors and passers-by**	**Residents**	**Residents**
Issue	Global issue: Global warming	Global issue: Rising of sea level	Local issue: Air pollution due to global warming	Local issue: Rising of sea level
Location	Squares • Physical access • Social space	Squares • Physical access • Social space	Architecture • Visual access • Visual/Symbolic space	Anywhere in the city • Physical access • Everyday space
Forms	Sculpture	Installation	Visual Art	Art-activism
Materials	• Natural material • Present & future images	• Technology • Future images	• Scientific data & media • Present images in real time	• Scientific data & local community • Future images
Methods	To emphasise viewer's phenomenogical experience of watching a melting glacier in real time.	To emphasise viewer's sensory experience of a virtual flood.	To inform people about the current level of air pollution through using scientific data and coloured lights.	To engage with the diverse groups of residents, providing the scary and sad realities of climate change.
Characteristics of public art	• Social identity • Participation • Placeness	• Social identity • Participation • Placeness	• Symbolism • Aesthetic	• Local identity • Everydayness • Participation
Aims	↓ To raise individual's awareness and perception about climate change to a broader public through phenomenological and emotional experiences, which provides social learning, emotion, and action.			

4.2. Eco-Didactic through Emotional and Phenomenological Experience

Climate change art in public space provides a personal and emotional experience, emphasizing the educational value. What does "experience" mean? How does it affect or change a viewer's behavior? The examples discussed in the earlier section show an emotional connection between the public and the environment. Eliasson emphasizes changes through phenomenological experience, stating that "people have climate knowledge, and if we do [not] transform this knowledge into climate actions, we can never bring any change" [56]. However, it is difficult to measure the effect of climate change art on viewers' behaviors, and it has rarely been studied. This is because the effect on behaviors is a long-term process, and artworks are very different from controlled studies, where the reception of a message can be analyzed. In this sense, Adam Brenthel (2016) states that "climate change cannot be expected to be transmitted from sender to receiver, so the 'amount' of knowledge transmitted cannot be measured" [11]. Nevertheless, many theorists, such as John Dewey (1934), agreed that emotional experience is vital in order to understand and change the world. Dewey's aesthetics concentrate on "the role that the learning of concepts may play in experience" [57]. Dewey's experience is possibilities, which "foreshadow future happenings, awakens anticipation, and initiate action" [57]. Rau Girod (2003) also states that "aesthetic understanding transforms one's experiences and perceptions of the world" [57] (p. 12). This means that climate change art can transform our perception of the world through experiences, allowing us to act on these ideas.

The use of public art to highlight climate change asks us to think about the relationship between contemporary issues, art, social issues, and environmental issues [58] (p. 189). The use of public spaces (everyday, social, and symbolic spaces) as sites of artworks provides learning, emotion, and social action/behavior. Adam Brenthel (2016) states that emotional experience motivates people to do the right thing [11] (p. 59). Art in urban public spaces encourages the viewer to consider how these public spaces are linked to climate change. David Pinder (2008), in "Arts of Urban Exploration", states that "urban interventions [. . .] make use of artistic and creative means to question and explore social problems and conflicts without necessarily prescribing solutions" [59]. This means that the urban public spaces can become a didactic platform through engaging with arts.

In this sense, artists can also be described as "educators" who communicate with the public about climate change, connecting public spaces to this issue. In Rancière's (2009) terms, the artist is an "ignorant schoolmaster" who "does not teach his pupils his knowledge but orders them to venture into the forest of things and signs to say what they have seen and what they think of what they have seen, to verify it and have it verified" [58] (p. 11). Climate change art provides "a vicarious experience" [60] and helps us to see the image and learn, allowing viewers to communicate answers to certain questions to both themselves and other people. The use of metaphors and narrative is also powerful and helps viewers to understand the climate crisis we face, which triggers communications. The use of the public sphere can be a platform for opening discussion and learning about the increased issues of the global crisis in contemporary society [58] (p. 185). This means that our daily spaces in an urban context can be transformed into a pedagogical platform through experiencing artworks. These aspects encourage conversation between people, stimulating their thinking and behavior in their everyday lives [52].

Public spaces are also suitable arenas for exhibiting activities that contribute to a different experience. Creating artworks within a public realm provides a powerful way of helping the viewer to understand the work through sensory interaction, i.e., sight, hearing, or touch. As Miwon Kwon highlights, works in public spaces provide "multiple experiences dependent on the bodily presence of each viewing subject, in a sensory immediacy of spatial extension and temporal duration rather than instantaneously perceived in a visual epiphany by a disembodied eye" [61] (p. 1). This means that the artworks trigger viewers' perceptions and awareness, while at the same time, the work represents a particular experience of the future situation of global warming to the public in the present. Kwon also emphasizes the experience of works in public spaces.

Furthermore, Kwon states that the use of public space could be a bridge between the artwork and the audience and between the artwork and space, through the "lived bodily experience" [62] (p. 86). Kwon also noted that the site-specific gesture would have to be understood as reactive, "cultivating" the existing environments of the site [62] (p. 108). Artworks within an urban public realm emphasize the interwoven relationship between the pre-existing site of the public space and the work, which can be used for spreading awareness about global warming in various ways [62] (p. 177). It shows that climate change art in urban public spaces is a good arena to communicate with a broader public, "because the effects of climate change lie in the future, and the cause of climate change is invisible" [11,63] (see Figure 6).

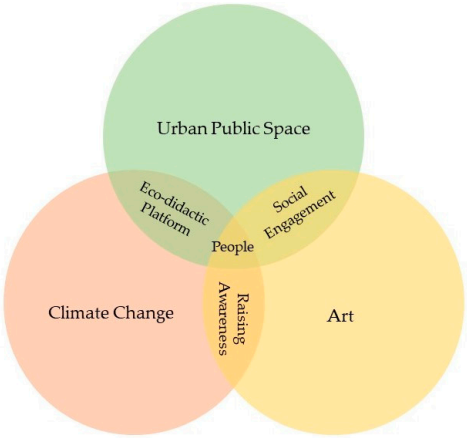

Figure 6. Interrelationship to art, climate change, and urban public space to build an eco-didactic platform. Source: Author's drawing

5. Conclusions

This paper is about the use of urban public space to spread awareness of climate change through art. This paper incorporates a literature review and a gathering together with documentation of theoretical research, based on issues of public art and climate change. I have explored socially situated aspects of urban public space as an eco-didactic platform to raise awareness through experiencing arts. The urban public space here refers not only to a physically open space, such as a park, squares, or streets, but also to visually or bodily open space, such as the façade of architecture and open areas in privately owned buildings. Focusing on climate change, I have argued that the intervention of art in urban public space offers effective ways of developing climate change art, which is understood to be an educator. Throughout this research paper, I found that public space is essential in order to raise awareness about climate change to a broader public, by providing an immersive and emotional experience. Public space presents (a) an open space that all people can easily access, (b) a social space where people can participate or communicate, (c) a symbolic space, and (d) educational space.

Although climate change is becoming a more important social issue in Korea, contemporary Koreans seldom respect its significations, but rather focus on government policies or scientific solutions. In this paper, I try to trace what effect public art has on the spread of awareness about climate change in a contemporary urban context, considering the roles of public space and the effects of art. It also concentrates on phenomenological and emotional experience in the way of understanding art, which affects the viewer's individual perceptions and awareness through phenomenological engagement. Art provides a personal connection to communication to offer individual awareness and social engagement. Although climate change art has been depicted in various ways through traditional media, new media, and social forms in various realms, the public space is a good arena for raising awareness of climate change to a broader public. The important aspects of using urban public space are to provide bodily participation and emotional experience in engaging the viewers, allowing them to communicate, recognize, discuss, and act. Thus, the urban public space can be transformed into an eco-didactic platform for spreading awareness of climate change or the global crisis, stimulating viewers' behavior and attempting to change it in order to achieve a sustainable future. In this paper, I have drawn upon the representative case studies about climate change to explore how they intervene in urban public space and how they engage viewers, providing an emotional experience to spread awareness, which is one of the fundamental aspects of this paper. They are summarized into three types, as follows: (a) Olafur Eliasson's Ice Watch and Daan Roosegaarde's Waterlicht, which provide the aesthetic value of sculpture (or installation) in prominent squares in cities and emphasize phenomenological experience. They also present information about climate change in a poetic way. (b) The Namsan Seoul Tower project, which engages symbolic

architecture as the cultural image of Seoul and shows the expanded concept of using public space. It engages scientific data and converts it into visual images, informing people about the local levels of air pollution, which affects viewers' behaviors directly. (c) Eve Mosher's High Water Line, presenting a social form of activism and integrating with residents in the realms of everyday life across the city. In this perspective, public art can be substantial in raising awareness of climate change. More discussions will be necessary in order to develop ideas on how artworks affect changes in personal behavior or what qualities artworks need to develop to become more powerful, which could be examined in future studies.

Climate change art in urban public spaces can help to cause the spread of emotional feelings and togetherness, leading to new and urgent ways of thinking, which helps us to change our behaviors and find solutions. Moreover, the idea of participation is very significant in climate change art in public realms. This paper, therefore, contributes to the understanding and knowledge of the relationship between art and public space with respect to raising awareness about climate change, considering how art intervenes in urban public space to create an eco-didactic platform.

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