

International Journal of Communication 14(2020), 2749–2772

1932–8036/20200005

Creative Communication Approaches to Youth Climate Engagement: Using Speculative Fiction and Participatory Play to Facilitate Young People’s Multidimensional Engagement With Climate Change

JULIE DOYLE¹

University of Brighton, UK

Climate communication calls for new climate stories that move beyond apocalyptic imaginings. This article focuses on the role of young people in the collective reimagining of climate change through an interdisciplinary creative youth project that used speculative fiction and participatory play to enable a group of 14- to 15-year-olds in the United Kingdom to produce their own climate communications. Cocreated with a third-sector arts partner and evaluated through participant observation and questionnaires, the project found that creative and participatory approaches encouraged sociocultural and emotional engagements with climate change, increasing young people’s feelings of efficacy. Yet, it also found that young people need careful support in understanding climate change as a multidimensional issue and in facilitating more positive and transformative climate-futures thinking. Interdisciplinary and creative climate communication education work thus needs to be prioritized to facilitate young people’s collective and socially transformative engagements with climate change.

Keywords: young people, climate change, creative climate communication, speculative fiction, participatory play, climate futures

Climate communication scholars call for new climate stories that move beyond “apocalyptic imaginaries” (Swyngedouw, 2010, p. 214) to offer more hopeful narratives (Moser, 2016). Central is the need to go beyond technocratic solutions circumscribed by the symbolic imaginaries of late-capitalist societies (Swyngedouw, 2010) to encourage interconnected and socially transformative understandings (MacGregor, 2014; Neimanis, Asberg, & Hedren, 2015). Stories and imaginative practices emerge from specific cultures and societies (Yusoff & Gabrys, 2011). Creating stories that offer critically hopeful engagements is crucial for engendering the “response-ability” (Haraway, 2016, p. 34) of collective care within climate-changed societies.

Julie Doyle: j.doyle@brighton.ac.uk

Date submitted: 2019–11–25

¹ This research was supported by funding from the Community University Partnership Programme, University of Brighton, UK. I wish to thank Ken Eklund, Rob Sandercock, Dan Danahar, the ONCA team, Michael K. Goodman, Julia Winckler, the two anonymous reviewers, and all the students who participated.

Copyright © 2020 (Julie Doyle). Licensed under the Creative Commons Attribution Non-commercial No Derivatives (by-nc-nd). Available at <http://ijoc.org>.

As the global youth climate strikes demonstrate, young people's voices are crucial to the collective restorying of climate change. Many young people have negative feelings about climate change (Hicks & Holden, 2007). Pessimism increases and hope decreases in late adolescence, impacting negatively young people's environmental efficacy and sense of well-being (Ojala, 2012b). Individualist, technocratic, and fear-based approaches to climate change can thus negatively influence young people's active participation.

This article situates the voices and perspectives of young people as central to the creation of more hopeful and engaging climate narratives. A creative youth climate project in the United Kingdom called FutureCoast Youth (2015) demonstrates how participatory play and speculative fiction/storytelling can be used to explore young people's perceptions of climate change and facilitate feelings of efficacy through the production of youth-generated climate communications. Play encourages collective participation, critical thinking, and joy (Kolb & Kolb, 2010; Regalado, 2015). Speculative fiction imagines possible futures that offer commentary on the present (Haraway, 2016). FutureCoast Youth brings these creative methods together to facilitate young people's engagement with climate change through creative communication.

FutureCoast Youth is based on FutureCoast (2014), an online digital storytelling project that asks audiences to imaginatively create voicemails from climatically changed futures. Adopting this speculative premise, FutureCoast Youth worked collaboratively with a group of twelve 14- to 15-year-old UK high school students to explore their perceptions of present and future climate change through participatory play and creative communication. Students produced their own creative climate work and presented it to an external audience through the fictional guise of a "Youth Climate Delegation From the Future," coinciding with the United Nations Climate Change Conference in December 2015. A fictional future was deployed as a narrative framing device to facilitate playful engagement with "possible worlds and possible times" (Haraway, 2016, p. 31).

The collaboration was between media and communication academics—Julie Doyle, Sarah Atkinson, and Helen Kennedy—at the University of Brighton and a third-sector environmental arts charity, ONCA (2018). Through participatory play and speculative storytelling, the cocreated aims were to (1) explore young people's understandings of present and future climate change, (2) facilitate creative engagement with climate change, and (3) evaluate whether creative participatory processes could foster young people's sense of efficacy and empowerment: "a sense that [young people] can make changes and help resolve important environmental issues" (Hungerford & Volk, 1990, p. 13). More specifically, efficacy was understood as multidimensional and emotional learning about climate change (Eilam & Trop, 2011) through creative participation. The cocreated aims emerged from a collective desire to encourage the development of youth voices about climate change, facilitate future thinking beyond technological solutions (Adam & Groves, 2011; Hicks, 2010, 2012), and address the current lack of research into creative communication approaches for youth climate engagement. As feeling overwhelmed about climate change increases with adolescence (Ojala, 2012a, 2012b), Haraway (2016) contends that to address despair, "we require each other in unexpected collaborations and combinations" (p. 4). Through a collaboration between media academics and creative practitioners/educators, we actioned this call, situating young people at the heart of the project.

This article contributes to nascent research exploring creative communication and participatory approaches for youth climate engagement (Haynes & Tanner, 2015; Lehtonen, 2012; Osnes, 2017; Rousell, Cutter-Mackenzie, & Foster, 2017). With growing interest in creative modes of climate communication (Boykoff, 2019), (participatory) arts (Burke, Ockwell, & Whitmarsh, 2018; Light, Mason, Wakeford, Wolstenholme, & Hieschler, 2018; Yusoff & Gabrys, 2011), and creative futures thinking (Facer, 2019; Tyszczyk & Smith, 2018), there remains a lack of research into creative participatory approaches for youth climate engagement. Young people's active participation is crucial because climate knowledge does not facilitate action (Lehtonen, 2012). FutureCoast Youth involved young people as active participants (Dunn & Mellor, 2017), enabling "genuine participation" (Hart, 1992, p. 36). Rousell and colleagues (2017) show how youth-generated speculative virtual game worlds can contribute to young people's capacity to think in more interconnected ways about future climate change. This article focuses more specifically on speculative fiction as a project narrative framing device that used participatory play *in situ* to develop young people's capacity to create their own climate communications and encourage multidimensional thinking about present and future climate change.

This article begins by bringing together and offering a brief account of climate-futures thinking and climate communication, youth climate education, and play. It then outlines the participatory and creative methods used, including explanation of the workshop process and immersive play events that framed the project. The results discuss how speculative fiction, creative communication, and play facilitated multidimensional learning and increased feelings of confidence and efficacy. Attention is also paid to the challenges of facilitating more positive and transformative climate-futures thinking.

As an exploratory project involving a relatively small number of youth participants (twelve 14- to 15-year-olds) in the United Kingdom, its findings are not meant to be universal. Given the current lack of research in this area, it instead seeks to generate discussions and further research into creative and participatory modes of youth climate engagement, particularly from the perspectives of creative climate communication (Boykoff, 2019; Rousell et al., 2017). If we are to facilitate socially transformative visions that avoid despair (Haraway, 2016), then young people need to be carefully supported to contribute to them. In encouraging emotional engagement, collective participation, and critical thinking, the creative approaches of participatory play, speculative fiction, and climate communication are important ways to enable this.

Climate-Futures Thinking

How future climate change is imagined is circumscribed by present cultural conditions. "Apocalyptic imaginaries" (Swyngedouw, 2010, p. 216) suffuse the cultural politics of late-capitalist societies, providing powerfully symbolic narratives that displace more radical social and political transformations. As such, climate change gets figured as an apocalyptic future "that can be retroactively re-scripted as a techno-managerial issue" (Swyngedouw, 2010, p. 224). To create different socioecological futures, Swyngedouw (2010) encourages contestation and disagreement and "different stories and fictions that can be mobilized" (p. 228). Transforming the "contemporary imaginaries of climate change" also requires an acknowledgment of the masculinized and apolitical narratives of technomanagerial solutions and a reorientation toward the "the ethico-political values of democracy" (MacGregor, 2014, p. 630).

Assuming responsibility for future generations in ways that move beyond the short-term economic "interests of the present" (Adam & Groves, 2011, p. 17) requires a focus on "care" as the "basis of ethical engagement with others" (p. 23). Extending to nonhumans and ecosystems, this ethical feminist perspective is based on relational care that recognizes how actions in the present have future effects (Haraway, 2016; Plumwood, 2001). Haraway (2016) promotes collective care through the creative playfulness of SF: "science fiction, speculative fabulation . . . speculative feminism, science fact" (Haraway, 2016, p. 2). Questioning late-capitalist visions of technomanagerial futures (MacGregor, 2014) thus requires changing the story about who and what we are entangled with, and envisioning more collective, caring, and hopeful futures.

Climate communication supports calls for nonapocalyptic stories. Whereas fear-laden imagery and negative narratives can generate feelings of disempowerment and disengagement (O'Neill & Nicholson-Cole, 2009), more hopeful climate communication can encourage positive action (Feldman & Hart, 2016; Ojala, 2012a, 2012b). Although Hornsey and Fielding (2016) found that the use of hope as a framing device in news media reportage was not "linked to mitigation activity" (p. 32), and that pessimistic messaging led to a higher motivation to undertake action, the average age of the participants in their study was 42 years. How young people are affected by negative climate change messaging is a body of research this article explores.

Youth Climate Education and Engagement

Research into youth climate engagement has increased over recent years. Consistent with previous findings (Hicks & Holden, 2007), Ojala's (2012b, 2012a, 2015) extensive research with young people in Sweden found that negative feelings about climate change increase from early to late adolescence. Dealing with these negative feelings enacts a range of coping strategies that affect behaviors (Ojala, 2012b), including problem solving (cognitive), distancing through deemphasizing the seriousness of climate change (wishful thinking), and promoting more positive thinking to encourage hope (meaning-focused strategies). Hope had a positive impact on young people's well-being and environmental efficacy, but is context based. Hope used to deemphasize climate change does not lead to proenvironmental behavior, whereas hope linked to problem solving or positive thinking (meaning-focused strategies) can lead to more concrete actions: "Some young people . . . more or less forced themselves to be hopeful and that this was very important because without hope there is no reason to do anything or plan for the future" (Ojala, 2012b, p. 547).

Increasing climate knowledge for schoolchildren is crucial, but does not guarantee proenvironmental behavior change (Hestness, McGinnis, & Breslyn, 2016). Furthermore, increased knowledge can lead to despair. Teachers and educators should take account of "the emotions felt, and the different emotion-regulating strategies used by young people" in dealing with climate change, and "help children by providing concrete examples of how they can behave pro-environmentally" (Ojala, 2012b, p. 554). Similarly, Hicks (2010) appeals for education to provide "the skills of envisioning alternative futures"; otherwise, "how can we even attain a more sustainable future unless we have practiced" (p. 17) these skills? Lehtonen (2012) argues that sustainability education should enable young people to acquire and evaluate information about the future and help them envision the more sustainable socioecological futures.

Educational setting is crucial for promoting such skills (Ojala, 2015), particularly if environmental knowledge is not supported by family (Ojala, 2012a; Stevenson, Peterson, & Bondell, 2019). In contrast to primary schoolchildren, Hicks and Holden (2007) found that “the majority of . . . teenagers claimed not to be involved in any action for change” (p. 507). Creating educational opportunities for motivation and engagement (Hestness et al., 2016) is thus crucial for teenagers, a pivotal age for establishing (or decreasing) proenvironmental behaviors. Given young people’s lack of formal political representation, teachers play a crucial role as trusted messengers (Corner et al., 2015). Trust in other societal actors, such as environmental nongovernmental organizations, is also high in young people and is related to generating feelings of constructive hope (Ojala, 2012a). Although young people view governments “as primarily responsible for taking action and exhibiting leadership on this issue” (Corner et al., 2015, p. 4), their trust in politicians is low. As such, using education to enable young people to develop a multidimensional understanding of, and engagement with, climate change that goes beyond formal politics is a crucial aspect of youth climate empowerment (see Teach the Future, 2020).

Participation and Play

Participatory environmental education actively involves young people, with environmental views established “in the communicative processes that take place between students and teachers” (Öhman & Öhman, 2013, p. 325). Supporting adolescents to talk about climate change can help develop personal and collective responses (Jensen & Schnack, 1997; Stevenson et al., 2019). Participatory environmental education research seeks to “make students capable of envisioning alternative ways of development and to be able to participate in acting according to these objectives” (Jensen & Schnack, 1997, p. 164). Although participatory approaches are criticized for not addressing certain power relations (e.g., between an adult and young person), participation can facilitate cognitive, emotional, and behavioral engagements with environmental issues (Lehtonen, 2012; Osnes, 2017).

Play—such as role-play and games—can encourage “interaction” (Henricks, 2008, p. 177) in nonthreatening ways (Regalado, 2015). Theories of play encompass psychology, education, and media. Kolb and Kolb (2010) identify the three main concepts of play across psychology and education: Play embraces the dialectical relationship among “playful and serious, imaginary and real, and arbitrary and rule bound” (p. 28); play is a learning process that “facilitates the expression of positive and negative emotions through engagement in fantasy and play” (p. 29); and play that takes place in a specific space and time (play space or ludic space) helps the behaviors associated with play thrive. Thus, “play is not simply a mental activity but one that also involves physical and emotional activities” (Henricks, 2008, p. 162), enabling play to be “significant source of creativity, imagination, and fun” (Kolb & Kolb, 2010, p. 26). From a media perspective, play (through interactive media forms) is understood as a culturally embedded (and embodied) form of engagement that can reproduce and challenge dominant power structures (Dovey & Kennedy, 2006).

Method

Adopting a participatory approach (Dunn & Mellor, 2017; Hart, 1992), FutureCoast Youth used a range of creative methods—including speculative storytelling and immersive play—to encourage participation, confidence building, and creative expression. Led by three trained arts facilitators—Persephone

Pearl, Keith Ellis, and Jack Darach—the 16-week project (September 2015 to January 2016) was delivered through eight fortnightly workshops: six at school and two at the ONCA art gallery. The project was awarded £4,355 funding by the University of Brighton Community University Partnership Programme to pay facilitators' time, travel, subsistence, and art venue hire. The resource implications of interdisciplinary and collaborative educational climate projects are returned to in the discussion.

The 12 participants were year 10 high school students (ages 14–15 years) from Dorothy Stringer School studying for the General Certificate of Secondary Education Environmental Science, the last cohort of English students to study this qualification. There were six girls and six boys, all White (no class information). Dorothy Stringer High School is a state-maintained comprehensive secondary school with more than 1,600 pupils 11–16 years of age, mainly White British, who are making average progress (UK Government, 2018). It is also an ecoschool: a global program in which environmental activities are pupil led (Eco-School, 2018). FutureCoast Youth benefited from this institutional environmental commitment through support of General Certificate of Secondary Education Environmental Science teacher Rob Sandercock and biodiversity coordinator Dan Danahar. FutureCoast Youth was not part of the students' formal assessment, but the teachers' support enabled "buy-in" from the students and parents/guardians. Although the aim was to encourage young people's sociocultural understanding of climate change, particularly important in a science learning context, the premise of FutureCoast Youth was that the format could be applied to any discipline.

Workshops: Approach, Content, and Evaluation

Workshops enabled students to think about climate change beyond scientific knowledge and technological solutions. "Scaffolded discussions" (Dunn & Mellor, 2017, p. 289) led by workshop facilitators always presented climate change as a multidimensional issue (Öhman & Öhman, 2013) requiring positive collective action. Creative techniques, including games, drama, and storytelling, were deployed to encourage group participation and critical and creative engagement with climate change. The third-sector facilitators (Pearl, Ellis, and Darach) led the workshops, with support from the academic team (Doyle). Being with the students, or "becoming-with" (Haraway, 2016, p. 12), was integral to the collaborative process. As a trusted mediator (Corner et al., 2015), the teacher was crucial in encouraging students' participation.

Speculative fiction and participatory play were framing and engagement techniques. The eight workshops included two immersive play events that bookended the project, delivered outside of the classroom at the ONCA gallery. The first play event was scripted and performed by the project team. Here, students were referred to throughout as the FutureCoast Youth team dedicated to addressing climate change through positive collective action. As an immersive and communicative event, the script facilitated students' multidimensional exploration of climate change through dialogic moments between the scripted characters (the project team) and students (explained in the Immersive Play Event section). The format of the final immersive participatory play event was codevised with the students *in situ* on the day.

Qualitative mixed methods (Haynes & Tanner, 2015) were used to evaluate workshops, including participant observation of the young people; critical analysis of students' creative outputs, student focus group discussion, student questionnaires at the end of the project; and the teacher's evaluation. For research with secondary school-age children, the National Children's Bureau considers "self completion-questionnaires

. . . and focus groups" (Shaw, Braidy, & Davey, 2011, p. 17) appropriate methods. A 30-minute focus group was conducted in the classroom at the end of the project, led by one of the third-sector facilitators. Students, however, were reticent to contribute. Focus groups in school settings operate through existing power relations in which "teachers act as gatekeepers and authorities" and have "an impact on data gathering" (Higgins, Nairn, & Sligo, 2010, p. 108). More informal focus group feedback at the end of the final immersive play event at the ONCA gallery enabled the students to contribute to discussions more openly. Mitigating against limited data collection in the focus groups, facilitators gave students self-completion questionnaires to allow reflection outside of the classroom.

Workshops were recorded through digital video and voice recorder, note taking, and photographing interactions and written outputs. The project team met throughout to ensure ongoing reflection and evaluation. University ethical approval was obtained, as was participant consent from parents/guardians. Participants could withdraw at any time. All students' names are anonymized.

Evaluation focused on students' cognitive and emotional responses to the creative process, their sense of confidence, and the climate communication they produced through their project-based learning. Students were "'active learners' involved in autonomous knowledge production" (Eilam & Trop, 2011, p. 55) and collectively engaged with the project's fictional narrative framework. FutureCoast Youth corresponded to Eilam and Trop's (2011) four essential pedagogical components for the implementation of environmental education: nonnatural teaching and multidisciplinary, multidimensional, and emotional learning. FutureCoast Youth actioned three pedagogies prioritized to ensure implementation: student-centered learning, minds-on and hands-on learning, and active participation (Eilam & Trop, 2011, p. 55).

Immersive Play Event: Climate Futures in the Present

Ken Eklund's FutureCoast (2014) online storytelling project provided the creative narrative context. FutureCoast invited gamers to become storytellers of the future by creating their own voicemails from/of the future (2020–2065). Online storytelling was augmented by offline activity: Three-dimensional plastic objects called *chronofacts* were left in real-world spaces as part of a fictitious *chronofall*, and GPS data were released to encourage offline gamer activity. Once a chronofact was found in the "real" world, the gamer typed the chronofact serial number into the FutureCoast website to release a voicemail from the future. Working in tandem, the voicemails and chronofacts created the speculative fictional context; the chronofacts were the physical embodiments of fictional software glitches in the future that released these voicemails "back to our time" (FutureCoast, 2014). With Eklund's permission, FutureCoast Youth used this speculative storytelling and participatory playfulness as a framing device to explore young people's engagement with climate change *in situ*.

The first immersive play event script was extensively adapted from a basic synopsis available on the FutureCoast website that invited audiences to stage their own voicemails from the future events. FutureCoast Youth used the fictional event approach, including students as (unscripted) characters, through the following synopsis:

Strange objects called chronofacts have been appearing in clusters at random locations around the world. Information from the future is encoded into these objects. The FutureCoast Youth team has been invited to FutureCoast HQ at ONCA for a top-secret mission—to find a chronofall and to help interpret the range of possible futures encoded in the messages from the future. The mission is top secret because the messages are showing us that there are an infinite number of possible futures, and that what we do here and now, today, shapes those futures.

Speculative fiction was used to playfully introduce students to multidimensional thinking about climate change, explore their current perceptions of climate change, and initiate climate-futures thinking. FutureCoast HQ (the ONCA gallery) was staged as a briefing center for the top-secret mission (see Figure 1): a world map on the wall illustrating a series of random locations where chronofalls had been (fictionally) reported. Climate news headlines from 2015 were displayed around the map to temporally anchor future climate in present climate realities. To facilitate initial immersion and adoption of the rules of play, one of the characters, Agent Wye, invited students to come into HQ and to write their “Agent” names on badges.



**Figure 1. FutureCoast headquarters, ONCA gallery, Brighton, UK.
Photo by the author.**

Dramatizing how people's worldviews and values shape climate understanding, three scripted characters offered different cognitive, emotional, and behavioral perspectives on climate change (see Figure 2). Agent Wye was the committed grassroots climate campaigner, passionate and hopeful about addressing climate change in collective ways; Agent Dr. Watt was the concerned climate scientist prone to making catastrophic and emotional pronouncements through scientific facts; and Howard the Caterer was the climate skeptic, providing refreshments and interjecting with dissenting comments. Howard's role was to facilitate student participation in nonthreatening ways (Regalado, 2015).



Figure 2. FutureCoast Youth immersive play event. Characters (from left to right): Howard the Caterer (Darach), Agent Dr. Watt (Doyle), and Agent Wye (Pearl). Photo from ONCA.

Dramatizing contrasting views enabled dialogic interaction with students in order to complicate and deepen students' perceptions of climate change:

Dr. Watt: Temperature data from four international science institutions all show rapid warming in the past few decades and that the decade between 2000 and 2010 was the warmest on record and [*voice rising and getting louder to create emphasis*] 2015 is the warmest year ever!!!

Howard: Lovely bit of sunshine. Let's face it, we could all do with it being a bit warmer around here. Come on, admit it.

Inviting student responses tested their own knowledge and negotiated dissent, a key aspect of futures education (Hicks, 2010, 2012). The students explained that climate change leads to extreme weather events, not just increased sunshine.

Howard: Fair enough, fair enough, but what about other issues? Like people being paid fairly? I don't see how you can ever get people to worry about climate change when they are worrying about how to pay for their family's food.

Moving from the science of climate change to its socioeconomic dimensions enabled a discussion to ensue about everyday climate impacts through the topic of food.

Foregrounding the importance of climate communication, the characters and script also linked the language of climate change to emotional and behavioral responses. For example,

Dr. Watt: The last scientific report by Intergovernmental Panel on Climate Change in 2014 stated *unequivocally* that significant greenhouse gas emissions cuts were necessary to avoid certain and *irredeemable catastrophe*!

Howard: Irredeemable catastrophe? This is horrible language! You're scaring everyone. Look at these poor children.

Agent Dr. Watt's use of apocalyptic language (MacGregor, 2014) when explaining climate science and Howard's (humorous) response drew attention to the disengaging effects of such language. Using emotional language to communicate science also challenged problematic notions of scientific objectivity (Plumwood, 2001). In contrast, Agent Wye's character always included meaning-focused strategies (Ojala, 2012b) and positive approaches to climate action.

A chronofall was introduced by Howard as part of the scripted narrative. Storming out of HQ in disgust in response to the language of catastrophe, he returned after a few minutes holding a chronofact. Students read out the encrypted number on the chronofact (see Figure 3), and three voicemails from the future were listened to (chosen in advance by the project team from the FutureCoast website). Stepping out of character, the project team asked the students to create their own voicemails from the future,

working collaboratively in groups or individually. The fictional play elements from this initial immersive event were then revisited in the final immersive play event at the end of the project.



**Figure 3. Members of the FutureCoast Youth team assessing the chronofact.
Photo by the author.**

Results

Young People's Understanding of Climate Presents and Futures

As present conditions shape future societal imaginings (Swyngedouw, 2010), the first workshop at school explored students' existing understandings of climate change, further supported by the dialogic interactions in the second workshop—the immersive play event described above—in which students produced their own voicemails from the future. Scaffolded discussions were used to explore what students' understanding of the causes, solutions, responsibilities, and challenges of addressing climate change were, and how they think climate change is being communicated. A mind map visualized the discussion. As expected from environmental science studies, scientific knowledge about climate change causes was high, with a range of impacts to the natural world identified. Prompted by facilitators, human and social impacts were also identified: financial and home losses, psychological stress, and human migration leading to climate refugees. Climate solutions composed the technological (e.g., renewable energy) and individual behavioral changes (e.g., using public transport).

Governments were identified as responsible for addressing climate change (Corner et al., 2015), with climate protests pressurizing “people in charge.” The communicative dimensions of climate protest were identified by some as helping draw attention to the issue. Emotional dimensions to the challenges of addressing climate change were also noted, including deploying coping mechanisms (Ojala, 2012b) such as distancing, to avoid feeling overwhelmed: “People might try not to know because it is too scary” (Tara).² Distancing by deemphasizing the seriousness (Ojala, 2012b) was also acknowledged: “People might not see the bigger picture because it doesn’t affect them in their day-to-day lives so they underestimate how important it is” (Maia). Difficulties in making lifestyle and behavioral (habits) changes were cited: “It’s easier to stay as you are rather than change” (Hannah). Economic constraints and individual/self-efficacy challenges were also noted: “Sometimes it’s cheaper to use fossil fuels” (Carl) and “What difference can I make?” (Ted). An emerging social gender difference between the responses of some of the boys and girls can be noted here, with emotional and communicative dimensions of protest recognized by some of the girls and the individualized and economic approach identified by some of the boys.

Students were knowledgeable about climate science, and able to identify some of the economic, political, emotional, and sociocultural challenges to addressing climate change. The notion that communication about climate change shapes perception and engagement (Doyle, 2011) proved more difficult. Directive questions such as “Can you identify some images of climate change?” generated the limited response of the polar bear, only after the teacher reminded students that they had discussed climate images in a previous lesson. Yet, students’ capacity to understand the emotional challenges of climate change illustrated strong potential for communication and storytelling to be deployed as climate engagement tools.

Voicemails from the future were cocreated by students in the second workshop as part of the first immersive play event. Forms ranged from phone conversations with family members to news reports and history documentaries. Dystopic visions and technofutures prevailed. For example, animal extinction and food shortages were communicated by making familiar everyday objects strange.

From Chronofact 2042:

Person 1: I heard there was going to be an auction for apples later.

Person 2: Apples, really?! How rare. But, we’ll never be able to afford that. Only land dwellers can afford such luxuries.

From Chronofact 2045:

Person 1: Hi Grandma! How are you? You’ll never guess what we saw today. It was amazing!

² All students’ names have been changed for anonymity. Parent/guardian permission has been given for photographs to be used.

Person 2: We saw a seagull. I've never seen one before in my life.

Person 1: We saw it yesterday. We went out . . . it was so hot! Erm . . . I never thought I'd get the chance to see one like you did.

Other voicemails used news reportage format to present "apocalyptic narratives . . . of chronic food shortages . . . and perpetual war" (MacGregor, 2014, p. 621):

The end of the 21st century brought the bloodiest conflicts the world had ever seen. In the 2080s food supplies finally ran out. . . . Worldwide famine occurred. This caused a period of time known as The Great Panic around most of the world with wide scale riots, battles, and anarchy.

Technosolutions were included in most voicemails: a "solar car" and "solar express." Yet, these also failed: "The solar car isn't working again because of global dimming, or something," and the promise of "lunar colonization" by building "a spaceship to colonize the moon and excavate its resources" collapsed because of war.

The fallacy of large technoprojects, however, was not replaced by socially equitable or positive futures. Rather, existing neoliberal conditions (MacGregor, 2014; Swyngedouw, 2010) were extended in new ways. The voicemail about apples positioned rich people as land dwellers and poorer people as water dwellers unable to economically access restricted food. This spatial delineation of power also occurred in a voicemail sent to Antarctica from two great-great-granddaughters wishing their great great-great-grandmother a happy 150th birthday; as an elderly person, she had been sent to live in Antarctica because of her economically unproductive status. A literal extension of the economic conditions of late-capitalist societies was presented in another news report voicemail:

News reporter: Today, I will be speaking to the person who bought the last ever watermelon. Hello, how do you feel about buying the last watermelon?

Person: Yes, I feel very privileged. *I might make some money by selling it* in a couple of years.

Students' futures thinking was circumscribed by large-scale technocratic solutions and apocalyptic imaginings about environmental loss and social deprivation, interspersed with moments of failure. Despite these dystopic imaginings, the teacher reflected positively on the practice: "Leaving messages from the future, made [students] visualize their own futures, which added a further personal connection with the realities of climate change" (Sandercock). Furthermore, the inclusion of social and economic dimensions indicated an important capacity for sociocultural thinking. Through collective evaluation of the voicemails in subsequent workshops, the facilitators encouraged students to think more positively about the creation of preferable futures through social action and collective solutions.

It was noted that some socially gendered differences emerged between how the girls and boys approached the format and content of the voicemails. All the girls' voicemails were intimate phone calls to family members; all the boys presented factual or news reports. The girls' visions of the future intersected personal and everyday familial relations, a politics of care (Adam & Groves, 2011; Haraway, 2016), with stories of biodiversity loss and harsher living conditions. The boys' visions of the future presented a more depersonalized, individualized, and simplified "grand" narrative using news and documentary genre modes to envision climate futures through late-capitalism, famine, and war. The absence of positive futures was noted for all students.

Empowering Through Student-Led Learning and Climate Communication

Following the creation of voicemails, the goal of the subsequent workshops was for students to produce their own climate communications and to collectively share these with offline and online audiences via the final immersive play event and project website (FutureCoast Youth, 2015). Prioritizing interdisciplinary and student-led learning (Eilam & Trop, 2011), facilitators encouraged students to use their own interests and hobbies and work collectively. Students, however, chose individual projects, perhaps reflecting time constraints as work had to be developed in the students' own time, and possibly the individual learning focus of the General Certificate of Secondary Education Environmental Science curricula (even though work produced for FutureCoast Youth was not formally evaluated).

Like Haynes and Tanner's (2015) experiences of young people's script development, more assistance with the choice and development of the creative communication project was required than expected. As in the first workshop when students struggled to identify climate imagery, understanding climate change from a communication perspective proved challenging. To support this, the project team incorporated a diverse range of climate communication examples in the workshops for students to engage with, including climate campaigns, news articles, music, and artwork, and encouraged students to bring their own examples. The workshops also used generic games to build group bonding, and deployed playful responses to climate change through games that required students to respond in embodied ways to facilitate multidimensional engagement. For example, students were asked to respond to the statement "I can make a difference to the challenge of climate change" by placing themselves on an imaginary line on the floor with one end agreeing and the other disagreeing. This facilitated discussion and debate. A lot of input, however, was required from the teacher beyond the formal workshop time to encourage students' engagement with the project in their own time.

Despite the challenges in supporting the student-led learning beyond the workshop time, all students produced their own communication climate projects (see FutureCoast Youth, 2015). Issues addressed were solutions, then impacts, and causes. Solutions included large-scale speculative geoengineering (iron fertilization of the oceans), renewable technologies (tidal power), and mass rewilding. Localized solutions included green roofs on buildings and individual carbon offsetting. Impacts prioritized the natural world and nonhuman nature in distant places (Australian frogs, Indonesian forest animals) or broad scale ecosystems via trophic cascades. Causes were identified through one student's focus on food miles, and another focused on climate communication specifically through a youth-centered manga comic.

Students' climate topics were more science and technology focused (including speculative geoengineering) than sociocultural. However, the identification of rewilding from one student foreshadowed a recent interest in this as a climate solution, and another's focus on the climate impacts of food miles illustrated the innovative potential of young people's sociocultural responses to climate change. Furthermore, the communication formats chosen demonstrated creative engagement through poetry, drawing, posters, and a hand-drawn manga comic. Again, it was noted that all of the creative formats were produced by girls.

Undertaking their own climate communication projects empowered students personally and educationally (Öhman & Öhman, 2013), engendering agency and deeper learning:

[I liked] being able *to choose* what to do for the project. . . . I did lots of research and *learnt things I probably wouldn't have in class*. (Amy)

I learnt most about the topic I studied. . . . It makes me *understand how complicated* a problem climate change is. (Carl)

We explore[d] the details *in more depth*. (Joe)

It made us *stop and think about what we were doing*. (Maia).

Students using creative communication formats (poetry, drawing, and comics) expressed multidimensional learning: "I liked that we were able to express our ideas, thoughts, and information through *creative mediums*. . . . It made us able *to see climate change in a different light*" (Maia). Creativity was also embedded within the speculative fictional premise of FutureCoast Youth, ensuring that students experienced climate communication in a variety of ways.

Facilitating Climate Engagement and Efficacy Through Creative Communication and Play

Creative communication was embedded in the narrative structure of FutureCoast Youth through the speculative dimension of the two immersive play events (bookending the project). The content and structure of the second and final event at the ONCA gallery was cocreated with the students on the day, enabling "genuine participation" (Hart, 1992, p. 36) through collective narrative ownership. Warm-up games (see Figure 4) and scaffolded discussions of the potential presentation structure facilitated group dynamics. As the "rules of play" (Kolb & Kolb, 2010, p. 30), students were reminded that they would present their climate communication outputs in character, as youth climate conference delegates from the future. Without a preordained structure for the presentation, however, one student commented, "It sometimes seemed a bit hectic" (Maia). With time pressures impacting, alongside the anticipation of presenting to an external audience later in the day, one student commented that it felt "disorganized" (Hannah).



Figure 4. FutureCoast Youth team doing warm-up games to help prepare for the final immersive play event. Photo by the author.

As a communicative event (Öhman & Öhman, 2013), students chose to present their communications in a game-show format to provide some light relief from the intensity of the (imaginary) formal conference negotiations. They deployed playfulness (including props) and a creative narrative to present their individual outputs. The invited external audience “played” the role of game-show audience, and the (student) compere asked the FutureCoast Youth team a series of multiple-choice questions created by the students. When a student answered the question correctly, they illustrated their answer through their own project. Dialogic interaction and critical contestation were embedded within the immersive event, enabling the presentation of different viewpoints and stories (Swyngedouw, 2010). Contestation about climate solutions was performed through two contrasting perspectives on geoengineering as a technofix; one was supportive, another was critical. Through PowerPoint presentation, both students employed visual humor to communicate their alternate views: An image of a kitten (rather than a polar bear) on an iceberg conveyed the importance of geoengineering as a “fix” for climate change; images of guinea pigs communicated geoengineering’s unknown dimensions, with humans and animals the “guinea pigs” in this technoscientific experiment.

Developing students’ capacity to become active learners (Eilam & Trop, 2011) was supported by the participatory methods in the final immersive play event, enabling students to take ownership of the narrative and pride in their outputs:

We were given the freedom to plan the presentation ourselves and had the power to control how we came across to the audience. (Maia)

I liked doing the presentation. (Ted)

I enjoyed it. I liked showing people the book and talking about it. (Amy)

The inclusion of a “formal” presentation to an invited adult audience, however, proved challenging to some students: “I didn’t like presenting. [I felt] nervous in front of people” (Tara); and “I would have preferred to present in a group” (Jack).

FutureCoast Youth’s playful approach was particularly important, illustrating the importance of joy through play in the learning process (Kolb & Kolb, 2010).

[I liked] the fun lessons. (Carl)

[I liked] that they took a lighter approach toward global action rather than send people into despair with horrifying facts and figures (Josh)

It was a different lesson rather than normal lessons and I learnt a lot. It was a *different way of learning*. (Ruth).

Students identified the combination of play and speculative fiction as contributing to their enjoyment: “I liked being creative” (Hannah); “I liked the creativity throughout—the future” (Amy); “I liked the creativity and enjoyment of it” (Josh). The role of play in encouraging collective participation (Henricks, 2008; Kolb & Kolb, 2010; Regalado, 2015) was also noted: “I liked how everyone got really involved in the activities we did” (Tara), and “[I liked] working together in pairs/groups” (Jack). Although students enjoyed the playful learning approach, adjusting to this engagement mode took time, with workshop facilitators and the teacher working hard to encourage participation. “Play space” is crucial for facilitating participation and establishing the rules of play (Kolb & Kolb, 2010, p. 30). Playful engagement was easier when students were outside of the classroom at the ONCA gallery for the two immersive play events. This was reflected in the more confident interactions and discussions they demonstrated at the end of the final immersive event, and not replicated in the formal focus group discussion with students in the school after the project had finished.

Increased confidence, however, was expressed by all students as a result of knowledge acquisition through self-learning (comprising causes, impacts, and solutions to climate change), multidimensional understanding—“Now I’m more confident that everything is connected” (Amy)—and communication—“I feel more confident in discussing climate change and how it affects us, others, and the world” (Maia). Again, it should be noted that there were gendered dimensions to how specific forms of knowledge acquisition impacted particular forms of efficacy for some students. For example, many of the boys’ confidence was related to technological solutions and individual agency:

I feel more confident about fixes to climate change. (Carl)

I now feel as I as an individual can make a difference. (Jack)

I feel I am capable of doing more about climate change. (Josh)

For some of the girls, confidence and efficacy were expressed through the sociocultural and communicative dimensions of climate change (Doyle, 2011; Neimanis et al., 2015): "I feel more confident because stuff I did on a website for people to see, it's like spreading awareness. . . . Now I'm *more confident* . . . in public speaking" (Amy).

Negative emotions about climate change increase through knowledge acquisition (Ojala, 2012b), but affective engagements with climate change are crucial for deeper learning (Lehtonen, 2012). As the teacher noted, "The workshops allowed subject matter to be discussed and explored through emotions and personal connections which was in stark contrast to how we had taught it before through textbook and worksheet exercises" (Sandercock). The majority of the boys stated that their feelings had not altered as a result of the project or they felt more positive about their own individual agency. Only one commented negatively: "It is bad" (Carl). In contrast, some of the girls expressed competing emotions: "I feel more *optimistic* about being able to make a difference. [I] also feel like it's *worse* than I thought" (Hannah), and "I do feel more *optimistic*, but also more *nervous* about how fragile the earth is" (Tara). Strong feelings of optimism and well-being were positive outcomes. Yet, it was the contradictory feelings identified by some of the girls that accompanied more interconnected understanding and communicative approaches to climate change.

Discussion

From a climate education perspective, the young people responded positively to creative and imaginative engagement with climate change. Play created a nonthreatening space (Henricks, 2008; Kolb & Kolb, 2010), and student-led projects enabled deeper learning, increasing confidence and efficacy. Within an environmental science class, exploring climate change from a creative and sociocultural perspective led to more complex and emotional engagements. The role of teachers in supporting the emotional dimensions of climate change was key (Ojala, 2012b). The teacher noted that "students were able to consider this significant and often overwhelming topic at the same time as getting to know their new classmates" (Sandercock). FutureCoast Youth demonstrates that, with teachers' support, creative approaches to climate change should be included in formal education to facilitate multidimensional understandings. Central to this is the foregrounding of "affective practice" (Facer, 2019, p. 9) within education and academia.

Multidimensional understanding of climate change requires working in interdisciplinary, novel, and collaborative ways. FutureCoast Youth demonstrated that cocreated projects, among academia, third-sector partners, and formal education, can provide new learning perspectives, and help create "alliances beyond the walls of the school and the university" (Facer, 2019, p. 12). However, this requires economic and time resources that factor in how young people can be supported beyond the lifespan of a project.

Furthermore, within many educational settings, playful cocreation is an unfamiliar practice, generating “disorganized” feelings. More educational opportunities for cocreated projects (Hicks, 2012) exploring sociocultural dimensions of climate change would help foster young people’s creative and collaborative skills. FutureCoast Youth also showed that learning outside of a formal education setting—going out of the classroom—is beneficial, enabling thinking beyond specific disciplinary boundaries. Gaining young people’s trust and creating a safe learning space that encourages participation take time. In addition to the project team’s encouragements, the teacher’s input was crucial in keeping students focused outside the workshops and in contributing to the “scaffolded discussions” (Dunn & Mellor, 2017) in the workshops. Future projects that use creative approaches to youth climate engagement need to factor in time to gain trust, and to address some of the barriers to interdisciplinary learning that can take place within educational contexts.

Envisioning sustainable futures is a key skill of environmental education (Hicks, 2010, 2012; Rousell et al., 2017). Futures envisioned by young people in the FutureCoast Youth project revealed contradictory thinking: dystopic and technomanagerial, as well as personal and everyday focused. Informed by present conditions (MacGregor, 2014; Swyngedouw, 2010), students imagined futures that were catastrophic, capitalist, and socially unjust, while grounded in everyday familial relations. Although FutureCoast Youth did not specifically evaluate changes to students’ futures thinking at the end of the project, but rather their broader sense of learning, confidence, and engagement with climate change, the futures they imagined at the beginning call for more specific envisioning support (Hicks, 2010, 2012).

Through immersive play events and workshops, FutureCoast Youth built students’ confidence in expressing different viewpoints as key to futures thinking. Unlike Öhman and Öhman (2013), the goal was not to build consensus opinion. The project’s playful and nonthreatening narrative structure (Regalado, 2015), humorous dialogue, and disagreement (in both immersive play events) enabled future thinking to be a reflective process. Although this project found that more individualized and technomanagerial responses to climate change were generally expressed by the boys, and that more interconnected, emotionally complex, and communicative understandings of climate change were generally expressed by the girls, the group sample was too small to make any definitive observations, but are sufficiently apparent to be noted here. Most important, the messy (Haraway, 2016) and emotional work (Ojala, 2012b) of equipping young people with the skills of imaginative and critical thinking about climate futures should be a key priority for schools, and attuned to the challenges of moving thinking beyond technocratic solutions (MacGregor, 2014) toward narratives of relational and collective care.

Conclusion

FutureCoast Youth put into practice the call for more creative, speculative, and communication approaches to climate education and youth participation (Boykoff, 2019; Facer, 2019; Haraway, 2016; Light et al., 2018; Rousell et al., 2017). Speculative fiction and participatory play helped increase young people’s confidence and sense of efficacy, fostering feelings of optimism and hope that were meaning focused. Play encouraged creativity, participation, enjoyment, and deeper social learning through affective practice (Facer, 2019; Henricks, 2008; Lehtonen, 2012), crucial for addressing feelings of being overwhelmed and despair (Ojala, 2012b). Enabling students to be “active learners” (Eilam & Trop, 2011)

through production of their own creative climate communication also contributed to multidimensional learning. The formal educational setting within which the learning took place, however, did limit participation; it was only outside of the classroom that students really engaged. There is an urgent need for increased educational opportunities for interdisciplinary and participatory approaches to climate understanding that actively take young people out of the classroom and help facilitate multidimensional climate engagements.

Young people are already demanding educational support for climate change (Teach the Future, 2020). FutureCoast Youth took place before the global youth climate strikes emerged. The findings of the project thus anticipated and support the case for the urgent provision of educational opportunities for young people to imaginatively and playfully explore their responses to climate change and climate futures. This requires interdisciplinary and collaborative work that positions young people as active participants. Working with young people and establishing trust, however, takes time, making collaborative youth projects both time and resource intensive. Yet, FutureCoast Youth shows the power of creative and participatory approaches in facilitating deeper learning and efficacy that put young people's thinking, emotions, and communication at the heart of imaginative and social responses to climate change.

References

- Adam, B., & Groves, C. (2011). Futures tended: Care and future-oriented responsibility. *Bulletin of Science, Technology and Society*, 31(1), 17–27. doi:10.1177/0270467610391237
- Boykoff, M. (2019). *Creative (climate) communications: Productive pathways for science, policy and society*. Cambridge, UK: Cambridge University Press.
- Burke, M., Ockwell, D., & Whitmarsh, L. (2018). Participatory arts and affective engagement with climate change: The missing link in achieving climate compatible behaviour change? *Global Environmental Change*, 49, 95–105. doi:10.1016/j.gloenvcha.2018.02.007
- Corner, A., Roberts, O., Chiari, S., Völler, S., Mayrhuber, E. S., Mandl, S., & Monson, K. (2015). How do young people engage with climate change? The role of knowledge, values, message framing, and trusted communicators. *WIREs Climate Change*, 6(5), 523–534. doi:10.1002/wcc.353
- Dovey, J., & Kennedy, H. W. (2006). *Game cultures: Computer games as new media*. Maidenhead, UK: Open University Press.
- Doyle, J. (2011). *Mediating climate change*. Abingdon, UK: Routledge.
- Dunn, V., & Mellor, T. (2017). Creative, participatory projects with young people: Reflections over five years. *Research for All*, 1(2), 284–299. doi:10.18546/RFA.01.2.05
- Eco-School. (2018). Homepage. Retrieved from <https://www.eco-schools.org.uk>

- Eilam, E., & Trop, T. (2011). ESD pedagogy: A guide for the perplexed. *Journal of Environmental Education, 42*(1), 43–64. doi:10.1080/00958961003674665
- Facer, D. (2019). Storytelling in troubled times: What is the role for educators in the deep crises of the 21st century? *Literacy, 53*(1), 3–13. doi:10.1111/lit.12176
- Feldman, L., & Hart, P. S. (2016). Using political efficacy messages to increase climate activism: The mediating role of emotions. *Science Communication, 38*(1), 99–127. doi:10.1177/1075547015617941
- FutureCoast. (2014). Homepage. Retrieved from https://ccnmtl.github.io/polarhub/core_projects/futurecoast.html
- FutureCoast Youth. (2015). Homepage. Retrieved from <https://futurecoastyouth.wordpress.com>
- Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Durham, NC: Duke University Press.
- Hart, R. A. (1992). *Children's participation: From tokenism to citizenship*. Florence, Italy: UNICEF International Child Development Centre.
- Haynes, K., & Tanner, T. M. (2015). Empowering young people and strengthening resilience: Youth-centred participatory video as a tool for climate change adaptation and disaster risk reduction. *Children's Geographies, 13*(3), 357–371. doi:10.1080/14733285.2013.848599
- Henricks, T. (2008). The nature of play: An overview. *American Journal of Play, 1*(2), 157–180.
- Hestness, E., McGinnis, J. R., & Breslyn, W. (2016). Examining the relationship between middle school students' sociocultural participation and their ideas about climate change. *Environmental Education Research, 25*(6), 912–924. doi:10.1080/13504622.2016.1266303
- Hicks, D. (2010). The long transition: Educating for optimism in troubled times. Retrieved from <https://www.teaching4abetterworld.co.uk/Resources/download13.pdf>
- Hicks, D. (2012). The future only arrives when things look dangerous: Reflections on futures education in the UK. *Futures, 44*(1), 4–13. doi:10.1016/j.futures.2011.08.002
- Hicks, D., & Holden, C. (2007) Remembering the future: What do children think? *Environmental Education Research, 13*(4), 501–512. doi:10.1080/13504620701581596
- Higgins, J., Nairn, K., & Sligo, J. (2010). Peer research with youth: Negotiating (sub)cultural capital, place and participation in Aotearoa/New Zealand. In S. Kindon, R. Pain, & M. Kesby (Eds.),

- Participatory action research approaches and methods: Connecting people, participation and place* (pp. 104–111). Abingdon, UK: Routledge.
- Hornsey, M. J., & Fielding, K. S. (2016). A cautionary note about messages of hope: Focusing on progress in reducing carbon emission weakens mitigation motivation. *Global Environmental Change, 39*, 26–34. doi:10.1016/j.gloenvcha.2016.04.003
- Hungerford, H., & Volk, T. L. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education, 21*(3), 8–21. doi:10.1080/00958964.1990.10753743
- Jensen, B. B., & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research, 3*(2), 163–178. doi:10.1080/13504620600943053
- Kolb, A. Y., & Kolb, D. A. (2010). Learning to play, playing to learn: A case study of a ludic learning space. *Journal of Organizational Change Management, 23*(1), 26–50. doi:10.1108/09534811011017199
- Lehtonen, A. (2012). Future thinking and learning in improvisation and a collaborative devised theatre project within primary school students. *Procedia—Social and Behavioral Sciences, 45*, 104–113. doi:10.1016/j.sbspro.2012.06.547
- Light, A., Mason, D., Wakeford, T., Wolstenholme, R., & Hielscher, S. (2018). *Creative practice and transformations to sustainability: Making and managing culture change*. Swindon, UK: Arts and Humanities Research Council.
- MacGregor, S. (2014). Only resist: Feminist ecological citizenship and the post-politics of climate change. *Hypatia, 29*(3), 617–633. doi:10.1111/hypa.12065
- Moser, S. (2016). Reflections on climate change communication research and practice in the second decade of the 21st century: What more is there to say? *WIREs Climate Change, 7*(3), 345–369. doi:10.1002/wcc.403
- Neimanis, A., Asberg, C., & Hedren, J. (2015). Four problems, four directions for environmental humanities: Toward critical posthumanities for the Anthropocene. *Ethics and the Environment, 20*(1), 67–97. doi:10.2979/ethicsenviro.20.1.67
- Öhman, J., & Öhman, M. (2013). Participatory approach in practice: An analysis of student discussions about climate change. *Environmental Education Research, 19*(3), 324–341. doi:10.1080/13504622.2012.695012
- Ojala, M. (2012a). Hope and climate change: The importance of hope for environmental engagement among young people. *Environmental Education Research, 18*(5), 625–642.

- Ojala, M. (2012b). Regulating worry, promoting hope: How do children, adolescents, and young adults cope with climate change? *International Journal of Environmental & Science Education*, 7(4), 537–556.
- Ojala, M. (2015). Hope in the face of climate change: Associations with environmental engagement and student perceptions of teachers' emotion communication style and future orientation. *Journal of Environmental Education*, 46(3), 133–148. doi:10.1080/13504622.2011.637157
- ONCA. (2018). Homepage. Retrieved from <https://onca.org.uk>
- O'Neill, S., & Nicholson-Cole, S. (2009). "Fear won't do it": Promoting positive engagement with climate change through visual and iconic representations. *Science Communication*, 30, 355–379. doi:10.1177/1075547008329201
- Osnes, B. (2017). *Performance for resilience: Engaging youth on energy and climate through music, movement, and theatre*. London, UK: Palgrave Macmillan.
- Plumwood, V. (2001). *Environmental culture: The ecological crisis of reason*. Abingdon, UK: Routledge.
- Regalado, C. (2015). Promoting playfulness in publicly initiated scientific research: For and beyond times of crisis. *International Journal of Play*, 4(3), 275–284. doi:10.1080/21594937.2015.1106049
- Rousell, D., Cutter-Mackenzie, A., & Foster, J. (2017). Children of an earth to come: Speculative fiction, geophilosophy and climate change education research. *Educational Studies*, 53(6), 654–669. doi:10.1080/00131946.2017.1369086
- Shaw, C., Braidy, L. M., & Davey, C. (2011). *Guidelines for research with children and young people*. London, UK: NCB Research Centre.
- Stevenson, K. T., Peterson, M. N., & Bondell, H. D. (2019). The influence of personal beliefs, friends, and family in building climate change concern among adolescents. *Environmental Education Research*, 25(6), 832–845. doi:10.1080/13504622.2016.1177712
- Swyngedouw, E. (2010). Apocalypse forever? Post-political populism and the spectre of climate change. *Theory, Culture and Society*, 27(2–3), 213–232. doi:10.1177/0263276409358728
- Teach the Future. (2020). Homepage. Retrieved from <https://www.teachthefuture.uk>
- Tyszczyk, R., & Smith, J. (2018). Culture and climate change scenarios: The role and potential of the arts and humanities in responding to the "1.5 degrees target." *Current Opinion in Environmental Sustainability*, 31, 56–64. doi:10.1016/j.cosust.2017.12.007

UK Government. (2018). Find and compare schools in England. Retrieved from <https://www.compare-school-performance.service.gov.uk/school/114580>

Yusoff, K., & Gabrys. J. (2011). Climate change and the imagination. *WIREs Climate Change*, 2(4), 516–534. doi:10.1002/wcc.117