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RESEARCH ARTICLE

# ART FOR CHANGE: Transformative learning and youth empowerment in a changing climate

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Young people represent a powerful force for social change, and they have an important role to play in climate change responses. However, empowering young people to be "systems changers" is not straightforward. It is particularly challenging within educational systems that prioritize instrumental learning over critical thinking and creative actions. History has shown that by creating novel spaces for reflexivity and experimentation, the arts have played a role in shifting mindsets and opening up new political horizons. In this paper, we explore the role of art as a driver for societal transformation in a changing climate and consider how an experiment with change can facilitate reflection on relationships between individual change and systems change. Following a review of the literature on transformations, transformative learning and the role of art, we describe an experiment with change carried out with students at an Art High School in Lisbon, Portugal, which involved choosing one sustainable behavior and adopting it for 30 days. A transformative program encouraged regular reflection and group discussions. During the experiment, students started developing an art project about his or her experience with change. The results show that a transformative learning approach that engages students with art can support critical thinking and climate change awareness, new perspectives and a sense of empowerment. Experiential, arts-based approaches also have the potential to create direct and indirect effects beyond the involved participants. We conclude that climate-related art projects can serve as more than a form of science communication. They represent a process of opening up imaginative spaces where audiences can move more freely and reconsider the role of humans as responsible beings with agency and a stake in sustainability transformations.

**Keywords:** Climate change; Education; Transformative learning; Art; Adaptation; Transformation

## Introduction

> We can't solve a crisis without treating it as a crisis. We need to keep the fossil fuels in the ground, and we need to focus on equity. And if solutions within the system are so impossible to find, maybe we should change the system itself. … We have come here to let you know that change is coming, whether you like it or not.
>
> – Greta Thunberg at COP24, Dec. 2018

Young people represent a powerful force for social change, and they have an important role to play in climate change responses. They are expressing dissent against the status quo in a number of ways, and not all of them are associated with traditional climate change activism (O'Brien et al., 2018). As 15-year old Greta Thunberg (2018) made clear in her speech at the COP24 meeting in Katowice, Poland, the challenge of climate change transcends individual change and includes systems change. Empowering young people to be "systems changers" is not, however, straightforward. It is particularly challenging within educational systems that prioritize instrumental learning over critical thinking and creative actions.

Over the past decades, an instrumental approach has been widely criticized in the education for sustainability literature for providing insufficient foundations for meeting today's complex social-ecological challenges (Blake et al., 2013; Chawla and Cushing, 2007; Krasny et al., 2010; Sterling and Orr, 2001). For example, Field (2017, p. 84) notes that "[t]he agency of children and young people to be active participants in their educational choices (beyond competing in the global economy) is absent. It seems that adults have already defined the goals and the rules that have predetermined young people's future(s)." Helping students to imagine alternative futures in relation to climate change requires going beyond the "banking system" of education described by Paolo Freire (1970), whereby educators impose their own view of the world onto students and inhibit creativity. Such an approach to education constrains the potential for systems change. As

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novelist Doris Lessing (2008: xxii) wrote: "You are being taught by people who have been able to accommodate themselves to a regime of thought laid down by their predecessors. It is a self-perpetuating system." To enable both critical thinking and creativity to thrive among young people in a changing climate, there is a need to transform education itself.

In this paper, we explore the potential for youth empowerment through transformative learning, and in particular the role of art as a driver for societal transformation in a changing climate. Transformative learning is defined by Mezirow (2000, pp. 7–8) as the "the process by which we transform our taken-for-granted frames of reference […] to make them more inclusive, discriminating, open, emotionally capable of change, and reflective so that they may generate beliefs and opinions that will prove more true or justified to guide action". Such an increased capacity to take perspectives relates to what is typically understood as a sense of empowerment, namely the process enhancing an individual's or group's capacity to make choices and transform those choices into desired actions and outcomes (Schreiner et al., 2005; Alsop and Heinsohn, 2005).

Drawing on the literature on transformative learning and the transformative potential of art, we consider how an experiment with change can facilitate reflection on relationships between individual change and systems change. Based on an experiment carried out with students at an Art High School in Lisbon, Portugal, the research explored the following questions:

1) What kind of critical thinking and awareness of climate change can be generated through transformative learning and art?
2) What kind of new insights and relationships are generated (e.g., to self, nature, climate and resources)?
3) Does experiential learning that includes art create a sense of empowerment among young people, and how is it expressed?
4) What are the observed effects on the wider social environment (e.g., school, family, friends)?

Below, we contextualize this research within current discussions of climate change adaptation and transformations to sustainability and consider the role of transformative learning and art. We present results from the study and then draw some preliminary conclusions about the role of transformative learning and art to engage young people in climate change action as both critical thinkers and empowered agents of change.

## Climate change adaptation through transformation

Climate change has been framed largely as a technical problem that can be solved with greater knowledge, expertise, management, and innovation (Biagini et al., 2014; O'Brien and Selboe, 2015; Tyszczuk and Smith, 2018). Consequently, the focus of most responses and "solutions" to climate change have been quite practical, with an emphasis on technologies and behavioral changes that align with mitigation or adaptation goals. For adaptation, commonly defined as the "process of adjustment to actual or expected climate and its effects" (IPCC, 2014, p. 1758), this often involves the identification of impacts and vulnerabilities associated with warmer temperatures, drier or wetter conditions, or extreme events (Pelling, 2011; Smit and Wandel, 2006). Response strategies generally include efforts to adjust to actual or expected climate change impacts, for example by raising bridges, cultivating heat-resistant crops, or developing early warning systems for floods or droughts. However, a technical approach to climate change typically fails to capture the complexity of factors affecting vulnerability or influencing individual and collective human behaviours (Ford and King, 2015).

Top-down, scenario-based approaches to both adaptation and mitigation are both informed and constrained by the projections of climate models and integrated assessment models, in the sense that they take the projected changes as a given based on implicit assumptions about social change and systems change (O'Brien, 2018; Tyszczuk and Smith, 2018). For example, integrated assessment models generally assume that current economic and social systems will remain constant over time; they are based on extrapolations of past trends into the future (Kirby and O'Mahony, 2018). The resulting projections do not challenge some of the key assumptions that currently reinforce the status quo, particularly assumptions related to social, economic, and political change (Cameron, 2012; Pelling, 2011; Ribot, 2014). Nor do they include the possibility that individual and collective agency can dramatically alter current systems to influence patterns of consumption and resource use (Leichenko and O'Brien, 2019).

A limited perspective on social change and systems change influences the current discourse on adaptation, leading to the conclusion that adapting to temperature increases of 4°C or more may be required in the course of this century (Dunn et al., 2017; New et al., 2011). Yet such an approach to adaptation circumscribes the politics of climate change by accommodating it, rather than contesting it (Cameron, 2012; Pelling, 2011). It has been criticized for failing to question the structures and systems that contribute to social vulnerability (Ribot, 2014). Within such approaches, the engagement of affected communities and stakeholders is generally underestimated by assuming a limited role for human agency, and political agency in particular. Furthermore, it overlooks the normative dilemma surrounding what is considered a desirable or good trajectory of change, and not the least, who decides what is "good" (Eriksen et al., 2015).

The concept of transformational adaptation is defined as a fundamental alteration of the nature of a system, once the current ecological, social, or economic conditions become untenable (Nelson et al., 2007). This concept is attracting attention within the climate change research community, as there is a growing recognition of the need for more critical and reflexive approaches to both adaptation and transformation (Blythe et al., 2018; O'Brien, 2015; Pelling, 2011; Pelling et al., 2015). This is reflected by the integration of the Three Spheres of Transformation in the IPCC Fifth Assessment Report (Denton et al., 2014). Although not a theory of change per se, the Three Spheres can be considered a heuristic

that acknowledges and integrates different dimensions of transformational change (O'Brien, 2018; O'Brien and Sygna, 2013; Sharma, 2017). The so-called practical, political and personal spheres of transformation are abstractions of the multiple and interacting changes needed to realize a particular goal or outcome. The framework builds on the approach of Monica Sharma (2017), which is based on empirical work in the field of development. It provides a simple and accessible way to think about social transformations, and is broadly compatible with other theories and approaches, including the multi-level perspective, social-ecological transformations, social innovation, and social practice theory (O'Brien and Sygna, 2013).

The practical sphere includes technical, managerial and behavioral responses that can be observed and measured, and are often associated with specific goals or targets. The political (or systems) sphere represents the norms, rules, regulations and incentives that facilitate or impede changes in the practical sphere. Action and inaction in the practical and political spheres are influenced by subjective views and perceptions of the world. The personal sphere thus acknowledges the significant role of individual and collective beliefs, values, worldviews and paradigms in change processes. They influence how systems are viewed, which theories, relationships and goals are considered legitimate or desirable, and which interventions are prioritized. Drawing on Integral Theory (Riddell, 2013; Wilber, 2001), the framework recognizes that behaviors, systems, culture, and experience are interdependent, thus all three spheres are significant to sustainability transformations, particularly in relation to climate change responses (Leichenko and O'Brien, 2019; O'Brien, 2018).

As with all concepts, transformation risks becoming coopted and misused by those with an interest in maintaining the status quo. It is thus important to address questions of transformation of what, by whom, and for whom. As Blythe et al. (2018, p. 13) argue, "the dark side of transformation, by which we mean the risks associated with discourse and practice that constructs transformation as apolitical, inevitable, or universally beneficial, has the potential to produce significant material and discursive consequences." A critical, reflexive approach to change can be considered a prerequisite for realizing transformations to an equitable and sustainable future within the context of climate change.

## Transformative learning

There is a growing recognition that complex, non-linear and potentially irreversible changes associated with global environmental problems call for a different approach to education (Blake et al., 2013; O'Brien et al., 2013). Transformative changes in education can contribute to new perspectives on both the problems and solutions associated with climate change and sustainability issues (Sterling, 2001). It has been argued that a fundamental change in education is a prerequisite for sustainable development in human society and that education can offer new ways of looking at sustainable development (Cullingford and Blewitt, 2004; O'Brien et al., 2013; Unesco, 2017).

Research on education for sustainability has shown that formal education on climate change is often insufficient and inadequate to the challenge at hand (Anderson, 2012; Plutzer et al., 2016; Schreiner et al., 2005). This is particularly the case when climate change is framed as an environmental problem that requires expertise and political power to address. Although many young people are interested in climate change, it is easy for them to conclude that global problems are outside their sphere of influence (Schreiner et al., 2005). Feelings of helplessness, pessimism, and despair are common, and education about global issues may even increase these negative feelings (Hicks and Bord, 2001). It has been argued that the overemphasis on the negative impacts and dangers of climate change in climate communication and education can lead to feelings of hopelessness and inaction (Markowitz and Shariff, 2012; Moser and Dilling, 2011; Spence and Pidgeon, 2010). Ojala (2012) stresses the importance of constructive hope as a motivational force for student engagement with climate change. Creating space to acknowledge difficult emotions and discussing the link between individual and collective change is seen as important (Waldron et al., 2016). Locating climate change solely in the private realm of the individual consumer may even run the risk of undermining climate action whereas locating climate action in the citizenship realm can support the extension of the concept of action necessary to enable change (Waldron et al., 2016).

Transformative learning has gained attention in this regard due to its potential to enhance young people's agency, and to facilitate their active participation in complex problems. This approach builds on Freire's (1974) idea that education should contribute to a critical awareness (*conscientização*), also seen as an increased capacity for choice, which is the basis for conscious action. In other words, education should help people to become the subjects or authors of their own lives, capable of critical reflection and of transforming the world.

Common among transformative approaches to learning is a focus on *processes* of learning, whether through dialogical education (Freire, 1974, 1970) or social learning (Wals, 2007; Wals and Heyman, 2004). These learning approaches focus less on outcomes, and more on what people want to learn and how they learn. Research from psychology (Krathwohl et al., 1964; Rowson, 2011), sociology (Everard et al., 2016), environmental education (Barthel et al., 2018; Chawla and Cushing, 2007; Ernst and Theimer, 2011) management studies and environmental management (Ballard and Belsky, 2010; Sterling, 2010), among other disciplines, emphasizes the role of experience, exploration, dialogue, and reflection in transformative learning processes. Below, we consider how each of these can contribute to more empowering responses to climate change.

### *Experience*

Multiple studies suggest that it is through participative, experiential or action learning that people begin to question and reorient their existing values, knowledge and concerns (Brockbank and McGill, 2007; Chawla, 2007; Chawla and Cushing, 2007; Cullingford and Blewitt, 2004; Glasser, 2007; Krasny et al., 2010; Liefländer et al., 2013). Freire (1974, p. 13) emphasizes that a critical awareness

and sense of responsibility "cannot be acquired intellectually, but only through experience." Similarly, Mezirow (1997, p. 10) recognizes that transformative learning requires experiences designed to foster critical reflectivity, for example through use of instructional materials that "reflect the real-life experiences of the learners." This highlights the importance of the participatory and learning-by-doing components integrated into what can be described as a "Head, Hands and Heart" approach to learning (Singleton, 2015). This approach incorporates transdisciplinary study (head), practical skill sharing and development (hands), and translation of passion and values into behavior (heart) (Sipos, 2008). The organizing principle behind the Head, Hands and Heart approach is to engage cognitive, psychomotor and affective learning domains (Krathwohl et al., 1964), which has shown to be helpful in meeting the objectives of transformative learning (Sipos et al., 2008).

#### *Exploration*

When discussing transformative learning in relation to climate change, research has suggested that learning needs to be exploratory and open-ended, making room for creative, unexplored practices (Barthel et al., 2018; Chawla, 2007; Giusti et al., 2018) that shine light on the inner dimensions of sustainability (O'Brien and Hochachka, 2010; O'Brien and Wolf, 2010; Scheffer et al., 2017; Sharma, 2017). In contrast to traditional learning approaches, which tend to stay within existing boundaries and ways of thinking, transformative learning involves questioning assumptions and challenging "the given" (Bateson, 1999; Sterling, n.d.). Embracing the unexpected may imply making room for "not knowing" what needs to be learned or what might be the end result, and instead opening up for developing it through an exploratory process (Scheffer et al., 2017). Such an approach can foster critical reflection and an ability to understand the root causes of environmental degradation, cultivate new practices and engage with change and reorientation.

#### *Dialogue*

Dialogue can be understood as a flow of shared meaning in a group that provides a space from which new understandings can emerge (Bohm, 2004). Dialogue is crucial in a learning process and in dealing with conflict, as it is through dialogue that people gain an awareness of different norms, values, interests, assumptions, and constructions of reality. It can be seen as the "glue" that holds people and societies together (Bohm, 2004). Done in a collaborative and safe learning space, using dissonance to catalyze the unraveling of divergent views on conflicting issues, dialogue can contribute to the deconstruction of people's taken-for-granted frames of reference (Mezirow, 2000; Wals and Heyman, 2004). A dialogical approach also enables people to reflect on themselves and their responsibility and role in society (Freire, 1974). Freire's (1974) approach to dialogical education helps people to "see the world not as a static reality but as in the process of transformation" (Freire, 1970). This relates also to what is commonly understood as a process of empowerment, namely enhancing an individual's or group's capacity to make choices and transform those choices into desired actions and outcomes (Alsop and Heinsohn, 2005; Schreiner et al., 2005).

#### *Reflection*

Reflexivity, described as the ability to step back and reflect upon one's own thought process, values, prejudices and habitual action, is a prerequisite to questioning and, if necessary, breaking away from existing paradigms and ways of doing things (Bolton, 2005; Sundararajan, 2002). The development of reflexivity is a critical aspect of transformative learning and considered essential for the development of agency. Reflexivity enables people to engage with conflict and with a diversity of opinions, and helps to promote collaborative learning within diverse social, historical and material contexts (Lotz-Sisitka, 2012; Schlitz et al., 2010).

Developing reflexivity in a learning process can create knowledge, values and action competences among individuals and groups that allow them to participate more fully and effectively in making their own choices and taking responsibility for solutions and actions to complex challenges (Wals, 2007). With increased reflexivity often comes a shift in awareness not only of the individual self, but also of the self's relationship to others and to the world, or in other words, an increase in social consciousness (Schlitz et al., 2010). This can develop into a desire to engage actively in improving the wellbeing of others and the world. Importantly, however, reflexivity is not merely a rational, cognitive activity, and the connections between the cognitive, emotional and social aspects of reflection need to be considered (Mälkki, 2010).

Integrating experience, exploration, dialogue, and reflection into education has the potential to transform the ways that young people approach climate change and sustainability issues and more importantly, transform how they perceive their role in shaping the future (Barthel et al., 2018; Chawla and Cushing, 2007). To create meaning, it is critical to include more than the mere cognitive aspects of climate change but also ethical, affective and aesthetic knowledge that influence how people interpret and assign value to something (Castree et al., 2014). Many artistic approaches inherently include elements of transformative learning. Aesthetic practices in particular can contribute to deep emotional learning about sustainability that connects "hands, heart, and head" (Ivanaj et al., 2014). Through arts-based transformative learning, climate change represents an opportunity for more collaboration and innovation that can transform relationships with others and with nature (Galafassi et al., 2018a).

## The transformative power of art

Art, art-based methods, and aesthetics are considered an effective means of developing both passion and an emotional connection with sustainability issues (Shrivastava et al., 2012). Such approaches can also serve as a powerful means of expanding future imaginaries and developing new scenarios of transformative change (Galafassi et al., 2018b; Heras et al., 2016; Milkoreit, 2017; Tyszczuk and

Smith, 2018). It has been argued that art has the ability to transform society and create agency among people (Boal, 2000). Crucial to this ability is the idea that art can attend to and transform emotions, creating positive emotions such as hope, responsibility, care and solidarity (Ryan, 2016). This can then activate a desire to engage and contribute to alternative futures. As such, art can extend climate change engagement toward an affective, personal experience, creating a force that can help close the gap between what we know and what we do about climate change (Galafassi et al., 2018a).

Art has often been employed in an instrumental way to communicate or raise awareness about important social and environmental issues. It has been seen and used as a powerful communication tool to invoke both passion and understanding. Examples include ecological art of the 1970s and climate art in the early 2000s (Gabrys and Yusoff, 2012; Lesen et al., 2016). However, the approach of documenting and focusing on the problems, risk and impacts of environmental problems through art has not always led to pro-environmental behaviors. In fact, some of these artworks have been criticized for contributing to a sense of powerlessness (Moser and Dilling, 2011).

Importantly, art-science interactions have themselves transformed over time. Formerly limited to galleries and laboratories, art and science interactions have become commonplace within social, political, economic and environmental contexts outside of conventional institutions. In other words, laboratories have turned "inside out" to become the "world wide lab" (Latour, 2004) and shifted the traditional sender-receiver paradigm by engaging communities in creative processes (Hawkins, 2016; Jasanoff, 2003). Engagement using creative, artistic practices is believed to have the potential to go beyond science communication and help people to overcome psychological barriers to thinking about the problem (Stoknes, 2015). It can also make climate change meaningful for people in quest of transformation (Galafassi et al., 2018a). Below, we discuss five ways that art can contribute to transformative learning for systems change.

### *Creative imagination*

It has been argued that artistic practices and approaches can potentially provide innovative solutions for adaptation and mitigation (Gabrys and Yusoff, 2012). The creative imagination inherent in many artistic approaches can provide new terms of imagining socio-cultural and environmental issues (Milkoreit, 2017). This is attributed to art's capacity of creative imagination and serendipity, which can generate spaces for active experimentation and imagination (Kagan, 2010; Whitehead, 2006). Rather than buying in to "doom and gloom" narratives, artistic practices can stimulate new processes of inquiry and political engagement, opening up new possibilities for responding to climate change through more generative, supportive and integrative approaches (Hawkins, 2016; Milkoreit, 2017; Stoknes, 2015).

### *Perspective-taking*

Engaging with art can help people to see things from new perspectives. This occurs through art's ability to "slow down" thinking and generate new framings of issues (Stengers, 2005). Such processes contribute to a questioning of frames of reference and thus support reflexivity (Galafassi et al., 2018a). They can also unveil the values, beliefs and cultural identities behind perceptions and collective drivers of action (Stoknes, 2015). Artists who understand the language of cultural values and how they are embodied and represented can re-evaluate and re-contextualize them (Whitehead, 2006). For example, creative-artistic practices can shift awareness and openness towards more-than-human worlds (Tàbara and Chabay, 2013), providing access to different sources of cognitive, emotional and sensual experiences (Pearson et al., 2018) and address the barrier of cultural identity through new stories (Stoknes, 2015).

### *Complexity*

Artistic practices introduce a unique way of embracing social-ecological complexity. This includes the ability to engage with uncertainty and to trace how society and nature are intertwined in ways that open up alternative modes of relations to nature (Kagan, 2010). Artistic works are usually concerned with deepening questions rather than providing answers and solutions. In this sense, the arts can question the framing of a particular problem, opening up the possibilities for discovering new solutions and actions. Art can also embrace the complexities associated with dissonant values and behaviors, which are often identified as a barrier to more climate friendly ways of living (Stoknes, 2015). It has been argued that what makes art a unique contributor in transformations is its freedom to pursue open-ended explorations of any topic through an ever expanding set of practices not limited to finished outcomes or solutions (Galafassi et al., 2018a; Scheffer et al., 2017). Artistic practices can thus be processes of co-production of knowledge (Ryan, 2016) and transdisciplinary learning (Kagan, 2015). They generate new understanding and embodied knowledge through integrating multiple ways of knowing and engaging and eliciting more-than-rational, non-reductive knowledge and experiences (Galafassi et al., 2018a; Polanyi, 1966). For Augusto Boal (2000), art and specifically theater is itself a form of knowledge and a tool for social learning. Due to the social learning potential of arts, several scholars have there called for a "cultural turn" in climate action (Buckland, 2012).

### *Resistance*

Due to its freedom, art has also been used as a form of questioning political structures and systems (Latour and Weibel, 2005). Art often articulates what is unspeakable and unthinkable (Gabrys and Yusoff, 2012) and it makes explicit the implicit, and visible the invisible (Whitehead, 2006). Through its "radical uncanniness" (Rancière, 2013) and disruptive thinking, art can realign and reinvent political engagement or address denial of climate change in a more provocative way. It is argued that collaborations between the arts and sciences may open up possibilities for reconsidering the role of politics in relation to climate change (Gabrys and Yusoff, 2012).

### *Direct action*

Apart from imagining, art can pre-figure potential futures through direct action. It can develop and perform direct interventions, experimentations and re-design daily situations and social systems (Kagan, 2015). In other words, artists "compose and perform, initiate and carry-thru, design and execute. This creates a relatively tight feedback loop in the process" (Whitehead, 2006, p. 1). Such processes can make climate change feel near, personal and urgent, spreading new social norms and positive solutions and reducing perceived distance to the topic (Stoknes, 2015). Augusto Boal's (2000) Theater of the Oppressed is an example of direct action. Its role-playing serves as a vehicle for analyzing power, stimulating public debate and searching for solutions. Acknowledging the transformative power of this theater form, Boal states that "theater is change and not simple presentation of what exists: it is becoming and not being" (Boal, 2000, p. 28).

Transformative learning approaches that integrate art can empower and engage students in new ways by increasing creative imagination, perspective-taking, social-ecological complexity, resistance and direct action. In the following sections, we describe how the ART FOR CHANGE project explored the potential for youth empowerment through transformative learning and art.

## Empowering Transformative Learning: ART FOR CHANGE

The ART FOR CHANGE project explored the role of art making in transformative learning processes, particularly how it can empower young people to engage with a wider range of climate solutions. The project involved 24 eleventh-grade students (between 16 and 18 years old) within a Communication Design course at a public art high school in Lisbon, Portugal. The study focused on the potential to generate critical thinking, awareness, and new insights and relationships that contribute to a sense of empowerment among students. It also explored how the project influenced families, friends, and others, which we refer to as ripple effects.

### *Design*

The project consisted of an experiment with change that involved choosing one sustainable behavior (such as eating less meat, using more public transportation, avoiding plastic water bottles, etc.) and adopting it for 30 days. The 30-day-experiment with change took place from 12 January until 16 February 2018, and it included a transformative program that encouraged regular reflection and group discussions. The program was based on the idea that transformational processes involve changes in the practical, political and personal realms (O'Brien and Sygna, 2013).

During the experiment, the students explored what it means to change. For example, they discussed the carbon footprint of certain products and practices, reflected on social norms and structures as well as on individual and collective values, and analyzed the obstacles to both individual and collective change. They engaged in group dialogues and responded to reflection questions through an interactive on-line portal, as described below. During the 30-day experiment, each of the students started planning and developing an art project about his or her experience with change. This took the form of a brochure and a poster. Most students used drawings and aquarelle painting and/or collage, then digitalized them and finalized the design using Illustrator and Photoshop. The artworks were exhibited to family, friends, and the public in a local festival in Lisbon from 8–19 May, 2018.

### *Methods*

The research questions were explored through a multimethod approach that included surveys, group discussions, a web portal, and visual data. The surveys, which were administered to participants both before and after the experiment with change, included both open and closed-ended questions. Facilitated group discussions were held weekly during the thirty days; notes were taken and two of the discussions were recorded. Through an interactive web portal, students received one or two reflection questions every 3–4 days, and were encouraged to post and share their thoughts, stories and insights as text or using artistic forms of reflection in the form of sketches, drawings, images, or photos. They shared their difficulties and successes, as well as lessons learned about the many facets of change. Visual data included brochures and posters produced by the students at the end of their change experiments. The brochure and poster contained text, illustrations, drawings and collages.

The reflection questions for the participants and the topics of group dialogues addressed the practical, political, and personal spheres of transformation (O'Brien, 2018; O'Brien and Sygna, 2013). During the first week, discussions and reflections focused on the practical sphere, such as habits and logistical issues associated with the new behaviors. These included discussions around their specific change experiments, but also more generally about carbon footprints, the impacts of reduced meat consumption, and more sustainable modes of transportation. The second week addressed social norms, cultural expectations, and the barriers and incentives associated with change processes. In the third week, students reflected on structures and systems that support or hamper change, such as the presence of recycling systems or the availability of organic food and alternative packaging. Social norms, structures, and systems influences how society is collectively organized, thus are considered to represent the political sphere of transformation. The fourth and final week addressed the personal sphere of transformation, and included reflections on values and worldviews and the power to inspire and influence others. Values, as argued by Maslow (1970) and Schwartz (1992), are closely linked to underlying motivations. Individual and collective values and worldviews tend to define what is considered possible within a system (Schlitz et al., 2010), and changes can potentially lead to different "action logics", or ways of interacting with the world (Torbert et al., 2004). As a result, the personal sphere is considered a powerful leverage point for societal transformation (Abson et al., 2017; Göpel, 2016; Meadows, 1999; O'Brien, 2018).

Recordings of discussions were transcribed, and transcripts, notes and responses to open-ended questions were then coded. Coding is a heuristic and exploratory problem-solving technique that can encompass a diverse range of qualitative data including responses open-ended questions, transcripts of discussions and interviews, field notes and visual data (Saldaña, 2016). In a first cycle of coding, a code book was developed to define the meaning of each code, provide an example and create categories of codes. In a second cycle of coding, specific codes were assigned to the data using NVivo (version 20). Analytic memos were written to reflect on code choices and their operational aspects, including participants' routines, rituals, rules, roles and relationships. These data were used to identify emergent patterns and possible networks among the codes and categories. For example, text and recordings labeled with the code "empowerment" provided evidence for the perceived and expressed right to know, to be heard and to demand or implement change.

The visual data (artworks) were analyzed using a holistic interpretive lens guided by intuitive inquiry and strategic questions. First, analytic memos were written to document the intuitive impressions and holistic interpretations of the images. Afterwards, the credibility of the visual reading was assessed through supporting details from the posters and brochures – evidence that affirmed or disconfirmed the personal assertions. Codes were then derived based on the interpretative essence of the image, a method suggested by Saldaña (2016).

## Results: Transformative approaches to sustainability

The ART FOR CHANGE project sought to promote an experiential, integrative understanding of the practical, political, and personal dimensions of transformations to sustainability. Here we present some results linked to empowerment, focusing on how the experiment influenced participants' relationships with both the problems and solutions associated with climate change.

In the group discussions, as well as through the open-ended survey questions, the students conveyed that the project led to an increased awareness about climate change, a sense of urgency to act, and a better general understanding of the state of the environment. More specifically and in connection to the individual experiments with change, the students showed increased awareness about problems related to water shortages and quality, plastic pollution, their own ecological footprints, and the carbon footprint of food production.

The experiential approach of the project was recognized by some students as different from the usual one, in a positive sense. As such, an awareness of climate change was considered to be closely connected to the practical aspect of the project: the learning by doing and seeing with one's own eyes was considered by several participants to be the most important factor contributing to a different perspective. In some cases, the approach generated a continued interest in the project and the topic of climate change. The practical experience created a different approach and understanding of scientific data, and in a group discussion, a number of students expressed skepticism towards traditional presentations of the climate problem:

> We used to have presentations at the school about the global climate or about saving water but it never really affected us, it never really got to us. Now that we participated and saw it with our own eyes, we understood the reality and severity of it. (Male student, group discussion, 2018)

> At our age it's important to speak to us in a way that we understand it. If someone comes and reads out a presentation, after 15 minutes I am not listening anymore, I am gone. (Male student, group discussion, 2018)

Similarly, traditional teaching methods were criticized for providing only superficial information and not adequately communicating the severity of climate change, and even giving the illusion that climate change will not really affect them:

> We don't get to know about it. They don't really tell us what's happening in the world around us. With the project we learned in which bad shape the world is. In the classes they don't teach us these things in such a concrete way. We speak superficially about it [climate change] in a way that it seems that it doesn't affect us. (Female student, group discussion, 2018)

An awareness of the severity of the situation led to a sense of urgency to act, as expressed in one of the discussions by a female student: "We can't wait another year!" In some cases, the awareness about the state of the world was expressed as a wish to help people in need, through voluntary work and environmental projects. In other cases, it created a certain anger for not having been informed earlier about the urgency to address climate change, since younger generations are expected to be affected by it in the future. The understanding that a certain degree of climate change was unavoidable due to past emissions emphasized the right to know among the students:

> It's not our parents that will have to take up with this [climate change impacts], it's us and our future children! (Female student, group discussion, 2018)

Critical thinking and climate change awareness were expressed through an increased perception of the social-ecological complexities of climate change. This included reflections about not only the practical obstacles to change and the urgency to act, but also how society and nature are intertwined. The experiential part of the project was seen to be action-oriented, enabling students to both perceive and "embody" change:

> The project went from knowing to doing. Before, we also all knew about the existence of climate

> change, but the action [adopted change] that we did, even though it was a small one, provided us with a different awareness about the global situation than just knowing about it. We no longer think 'yes, the climate is changing globally but we are in a comfortable space'. When we started this project we started thinking about what we could do and what was really going on out there. It's reality, it's not something distant that eventually will affect us, it is already affecting us. (Female student, group discussion, 2018)

Research has shown that behavior may shape attitudes. The changed experiments did indeed show that some students shifted their perspective and attitudes. During the group discussions, for example, some students mentioned new insights on relationships and change processes. Some mentioned perceiving new relationships to resources, e.g. water, plastic or broader topics such as consumerism, and several students mentioned a new relationship to climate change. Students also described changes in their relationship with social-ecological systems and with others, as well as visions for new forms collaboration.

In some cases, these insights about relationships led to a shift in values and priorities, including in how one's own behavior was evaluated. For example, one student discovered her "own consumerist interior" (survey respondent, 2018) during the project, indicating a new insight about herself. Other students stated that they "changed behaviour which led to new routines which then led to new thoughts," or that the project involvement through experiential learning resulted in a "change of 180 degrees, no doubt" (survey respondents, 2018).

The project and the individual behavioural changes motivated several students to conduct further research about their topic. This contributed to an increased awareness about specific behavioural changes, for example, related to water consumption and shortage, meat production, health consequences of certain products (e.g. meat, soy) and the ecological footprint of food production. The new insights from such research were also illustrated in the art works. For example, one of the students showed humoristically in his brochure the large quantity of water necessary to produce a beefsteak by depicting the steak as a fish swimming in the amount of water that was used for its production (**Figure 1**).

Through the experience with change, a number of the students realized that their individual choice (e.g. related to food consumption, travel, etc.) had an impact globally. As such, one of the students gave the title "the choice is in your hands" to her poster that depicted a shopping basket; another student showed the impact of plastic water bottles with the title "it has an impact" (**Figures 2** and **3**).

Some students showed increased signs of self-reflection and self-awareness. One student shared that she now feels guilty when she forgets to switch of the lights before leaving home: "it stayed with me" (female student, group discussion, 2018). This new, more conscious relationship with the use of water and electricity is also illustrated in her artwork, making use of a personality named José

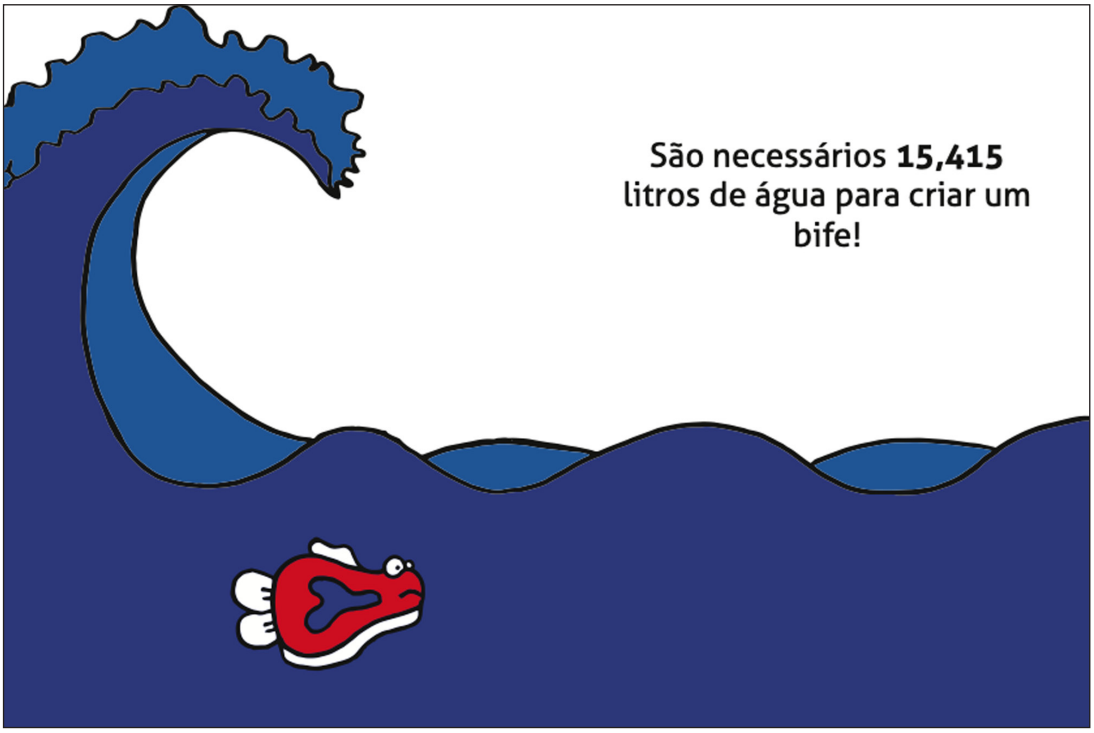


**Figure 1: Brochure excerpt illustrating the amount of water necessary to produce one kilogram of beef.** DOI: https://doi.org/10.1525/elementa.390.f1

Pedro who seems to be a little goblin or voice in her head that visits her when she doesn't turn off the lights or the tap (**Figure 4**).

Several other artworks and discussion comments illustrated new values, such as a poster with the title "less is more." One student's artwork depicted the last edition


**Figure 2: Poster of participating student.** DOI: https://doi.org/10.1525/elementa.390.f2

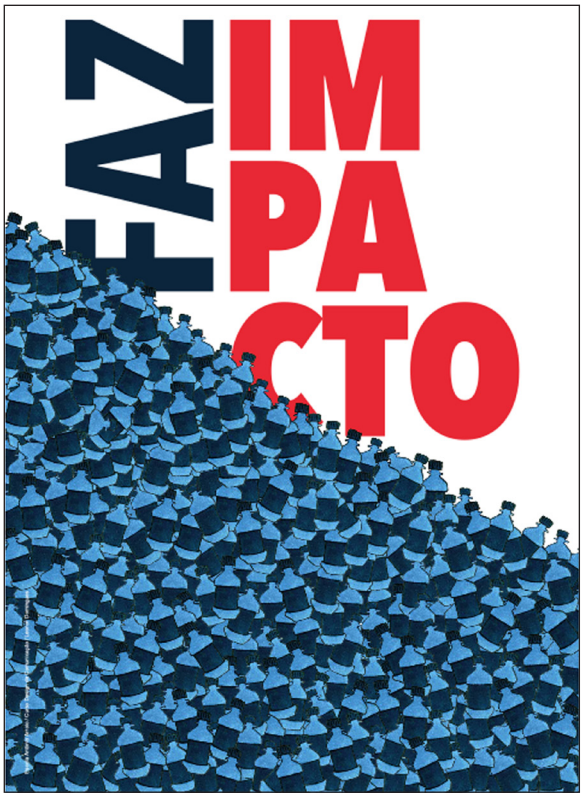


**Figure 3: Poster of participating student.** Translation: "Makes an impact". DOI: https://doi.org/10.1525/elementa.390.f3


**Figure 4: Brochure excerpt of participating student.** Translation: "Turn off the tap while brushing your teeth otherwise you'll receive a very unpleasant visit by Jose Pedro... I wouldn't recommend that". DOI: https://doi.org/10.1525/elementa.390.f4

of a newspaper before the end of human civilization, reporting about the migration of birds to planet Mars due to unlivable conditions on planet Earth (**Figure 5**). In another ironic-sarcastic artwork, aliens decided to remove the humans from planet Earth because they were polluting excessively and using too many natural resources (**Figure 6**). In fact, many criticized superficial values and current unsustainable forms of living in an ironic or sarcastic way (**Figures 7** and **8**).

A number of students were critical of the illusions transmitted through movies, cartoons, videogames and fairytales, particularly the idea that the good always win. They saw this narrative as contributing to the unconscious belief that this would be true for all aspects of life, including climate change, which resulted in an insufficient agency to address this challenge. As one of the students put it:

> One of the problems nowadays is that we give children the illusion that everything is beautiful and perfect, lots of princesses and the villains end up suffering. This is not only true for comics for very young ages. The idea is propagated in video games. Everybody becomes happy. Then when they reach adulthood they are completely ignorant. (Male student, group discussion, 2018)

This relates back to the students' feeling that they have not been adequately informed about climate change.

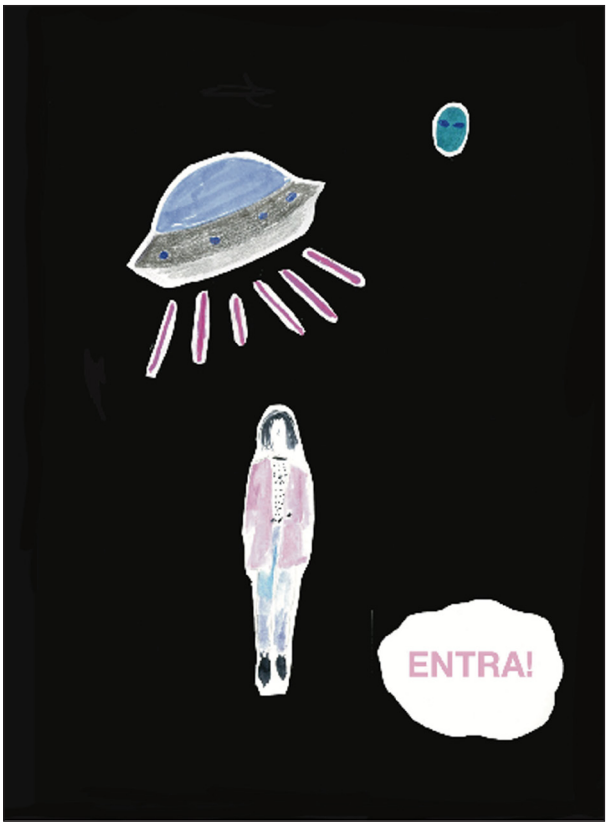


**Figure 6: Excerpt from student brochure.** Translation: "Get in". DOI: https://doi.org/10.1525/elementa.390.f6


**Figure 5: Excerpt from student brochure.** Translation: "Storks migrate to Mars. It is confirmed that they can no longer live on our planer". DOI: https://doi.org/10.1525/elementa.390.f5


**Figure 7: Excerpt from students' brochures.** Translation: "Happiness". DOI: https://doi.org/10.1525/elementa.390.f7


**Figure 8: Excerpt from students' brochures.** DOI: https://doi.org/10.1525/elementa.390.f8

They suggest that "instead of painting everything rosy, [to] open up for new realities" (male student, group discussion, 2018) by creating awareness about social and ecological challenges at younger ages. Some were even in favor of "shocking people".

For some students, these new insights created a perceived capacity to drive change and engage in collaborations to promote change on a broader scale: "we have to engage the people to collaborate more and more and like this maybe create a movement" (female student, group discussion, 2018). New relationships with climate change involved an inclusion of themselves as actors in the problematique. What was formerly perceived to be a distant problem that did not affect them (and was also not affected by their behavior) was viewed as part an interrelated system. This was expressed as a feeling of responsibility for climate change, and for addressing it:

> Since I started with this challenge I feel much more responsible for being aware about what I eat, whether it's healthy or causes harm to the environment. (Female student, group discussion, 2018)

Discussions around operationalizing large-scale transformations, including who should drive them and how, were divided. For some students, addressing a global-scale problem felt overwhelming and led to statements expressing a feeling of disempowerment: "we don't have the power" and "there are so many people in the world" (male student, group discussion, 2018). Some students pointed to those with responsibility to change: "the people with economic power have to do something" (female student, group discussion, 2018). Yet for several others, a lack of economic power was not perceived as an obstacle for action, and there was a strong sense of empowerment: "We don't have to change them all at once, we can affect the ones around us and they influence more and so on" and "Let's do it guys, let's change the world!" (Female student, group discussion, 2018).

In the survey, some students also realized that the project "prepared [them] to address greater challenges" and "to take initiative instead of just talking about them" (survey respondent, 2018). Several other statements also highlighted a different way of looking at climate change, and indicated a wish to contribute in a positive way: "It made me think about the problems and what I can change"; "It made me reflect about my surroundings and to be more aware about the changes. This feeling made me want to change and to help"; "This challenge created an awareness that we really need a change to make this world a better place and that most of these changes aren't that difficult" (Survey respondents, 2018). Feeling of empowerment and of empowering others were also expressed in the artworks, as shown in **Figures 9** and **10**.

In some cases, longer-term effects of the experiential learning could be observed, such as continued behavioral change: "Since the end of the 30 days I continue with the same [new] habits", "I had an obsession with [Chicken] Nuggets and can say that for more than a month I am not eating Nuggets" (Group discussion, 2018). "It made me create new habits and be more aware about my surroundings", "I am much more careful with buying plastic and avoid it since" (Survey respondents, 2018). Through the sharing of experiences with their colleagues, students became aware of each other's experiments and in some cases started adopting more than one sustainable behavior, triggered by the discussions and group reflections.


**Figure 9: Poster of student.** Translation: "Enjoy what you have, do what you can". DOI: https://doi.org/10.1525/elementa.390.f9


**Figure 10: Poster of student.** Translation: "There is a lot that needs to be done, do you help?" DOI: https://doi.org/10.1525/elementa.390.f10

"I started to become more aware about my habits, not only my challenge but also the ones that we discussed in the group" (Survey respondent, 2018). Several of the students managed to influence family members or friends by either convincing them to follow their example, or by simply showing them an alternative behavior:

> In addition of letting go of laziness, I contribute to a reduction of greenhouse gas emissions together with my dad whom I convinced to accept this challenge with me together and who bought a monthly ticket and is using public transportation to get to work and is saving money on gasoline. All this contributes to a less lazy and less polluted planet. (Male student, blog post 2018)

Other students were cooking vegetarian meals for their friends to show them alternatives to meat and fish dishes. This made them realize the power people have on others by being an example and sharing their personal story, as illustrated by a comment in the discussion: "Our whole life we have been confronted with this [environmental] problem, but it never affected us, so we didn't change. But what really influences is a person, if you have a testimony" (Female student, group discussion, 2018).

## Discussion: conceptual and practical contributions

The aim of this research was to explore conceptual and practical contributions to climate change education and transformation based on an exploratory study using transformative learning and art. This research was based on the idea that deliberate transformations require changes within practical, political, and personal realms (O'Brien and Sygna, 2013). It is important to emphasize that the objective of the ART FOR CHANGE project was not to promote long-term changes in individual behaviors, in order to reduce personal carbon footprints. This exploratory study was also not intended to be a definite response to the question of whether transformative learning programs involving art generates empowerment. Rather, the goal was to explore how transformative learning and art can contribute to greater engagement with the process of change through experience, exploration, dialogue, and reflection. The art component helped to engage creative imagination and perspective taking. It also helped the students to confront complexity and activate responses, such as resistance or direct action. There is need for further research using transformative learning and arts-based methods to better understand their potential for social transformations on a broader and longer time scale.

Despite the study's limitations, some insight about the power of engaging youth in arts-based transformative learning processes can be gained. Below we highlight some of these insights in relation to the four research questions posed in this study.

### *Critical thinking and climate change awareness*

The results show that the students became more aware of climate change and developed a sense of urgency to

mitigate and adapt. In this sense, the ART FOR CHANGE project managed to reduce perceived distance to climate change, making the topic meaningful, near and personal to them (Stoknes, 2015). The practical, learning-by-doing approach of the 30-day change and the reflections in a group (i.e., group discussions) contributed to reducing this distance. This relates to findings in environmental education that highlight the importance of experiential, hands-on education programs to promote connections with nature and pro-environmental attitudes (Chawla, 2007; Chawla and Cushing, 2007; Liefländer et al., 2013). Research has also shown that people are drawn to learning-in-action programs, particularly those that invoke care for both people and the planet (Sharma, 2017).

For some students, the newly gained awareness on climate change motivated them to conduct further research about the issue, which contributed to a deeper understanding of the social-ecological complexities of climate change, and how society and nature are entangled. This led in some cases to a critique of the traditional ways of teaching and of science communication as well as to the expression of anger for not having been informed earlier and for learning about the lacking global action to effectively mitigate climate change. This critique and anger may reflect in a way the *zeitgeist* of young people's mass demonstrations against insufficient climate action and injustice worldwide, better known as the Fridays-for-Future movement (fridaysforfuture.org). The expression of anger and sarcasm may also align with the idea of "feminist killjoy" by Sara Ahmed (2017). A feminist killjoy is one who is angry because that's a sensible response to what is wrong and is willing to kill the joy of, for example, living unsustainable lifestyles or denial of climate change (Ahmed, 2017; Verlie and CCR 15, 2018).

#### *New insights and relationships*

The gained awareness and critical thinking about climate change made the students question their frames of reference as well as values and beliefs, leading to new insights about themselves. Some mentioned new (more conscious) relationships to resources, e.g. water, plastic or broader topics such as consumerism and a new relationship to climate change. New insights could be observed by the students' questioning of their own lifestyles and by expression of guilt and sarcasm, e.g. through end-of-the-world narratives. This relates with findings in research on education about global issues that may (initially) increase feelings of hopelessness, pessimism and helplessness (Hicks and Bord, 2001). It has been argued that the overemphasis on the negative impacts and dangers of climate change in climate education can lead to feelings of hopelessness and inaction (Markowitz and Shariff, 2012; Moser and Dilling, 2011; Spence and Pidgeon, 2010). In contrast, more positive framings can evoke sense of hope, engagement and constructive strategies of coping (Ojala, 2015, 2012). Although this project focused on solutions and the potential of any person to make a difference, future studies should put greater emphasis on addressing the feelings of guilt, sadness and anger related to climate change and the future that is present among many young people.

#### *Sense of empowerment*

Among some students, new insights contributed to a perceived capacity to drive change and a wish to engage in NGOs, charities and institutions that promote change on a larger scale. Perceiving themselves as actors in the climate change *problematique* and the expressed feeling of responsibility for climate change and for addressing it were evidences of a generated sense of empowerment. However, for other students, addressing a global-scale problem felt overwhelming and led to statements of disempowerment. Although there is wide-ranging support of the idea of education for climate change empowerment (Kollmuss and Agyeman, 2002; Monroe et al., 2017; Waldron et al., 2016) there is limited research on how to successfully promote it (Hesselbarth and Schaltegger, 2014; Monroe et al., 2017). Group discussions are seen as a valuable tool in this regard as they can generate spaces in which students can question their assumptions, identify their values, compare evidence and explore perceptions (Chawla and Cushing, 2007; Monroe et al., 2017). First-hand exposure to people who experienced climate change impacts and interaction with climate scientists and looking at community rather than the global scale of impacts are also considered empowering (Monroe et al., 2017). Taking personal ownership of issues that young people work on and opportunities for direct experience in democratic processes, such as through participation in community projects, enables young people to come to their own decisions based on the information they gather and discussions they share (Chawla and Cushing, 2007). The ART FOR CHANGE project integrated many of the suggested empowering factors; however, it may have fallen short on providing opportunities for continued engagement after the project, such as through collaborations with institutions, NGOs or local community associations.

#### *Observed effects on the wider social environment*

The results show that the project created a number of ripple effects. For example, some students recognized that agency can be contagious. Several students managed to influence family members or friends by either suggesting to follow their example, or by simply showing them an alternative behavior. There is evidence that influence on others often occurs through dialogue (d'Ancona, 2017; Mezirow, 2000). It is through dialogue that taken-for-granted frames of reference become more inclusive and that new ideas are absorbed into the mainstream discourse (Freire, 1970; Mezirow, 2000). Through the group discussions, students became also aware of each other's experiments and some adopted more than one sustainable behavior. The students realized that their individual choices had an impact globally and on others, which led in some cases to continued behavioral change (after the 30 days). It made them realize the power people have on others by being an example and sharing personal stories. Both historic examples (such as the Civil Rights Movement in the United States) and research have shown that social norms can shift abruptly with small changes in cultural values (Castilla-Rho et al., 2017; Xie et al., 2011).

## Conclusion: The potential of transformative learning and art

The complexity of climate change requires innovative, radical, and creative approaches to education. Bruno Latour (2004, p. 30) suggests that climate change is a "collective experiment" that invites us to look beyond and work across the traditionally defined boundaries between science and art and between laboratory and gallery in order to address the complexities of social, political, economic and environmental contexts of climate change. This implies shifting the traditional sender-receiver paradigm in scientific, creative and educational processes and moving to more co-production of knowledge, integrating experience, dialogue, and reflection. Monica Sharma (2017, p. xiv) emphasizes the importance of stimulating people to see their contribution from a bigger perspective, recognizing that "everyone is a player, bringing in radical transformation as we solve problems, sourcing our compassionate hearts and integrating it with systems and cultural change." Fundamental changes in education can be seen as paramount for the creation of new perspectives on both the problems and solutions associated with climate change (O'Brien et al., 2013; Sterling, 2010).

The results presented above show that a practical and dialogical approach that combines art and transformative learning can contribute to a sense of empowerment and produce direct and indirect effects that extend beyond the involved participants. Integrating art and transformative learning can strengthen open-ended, exploratory thinking, as artists and artistic practices commonly address the unexplored and unexpected (Scheffer et al., 2017). Art's capacity to stimulate creative imagination can support this process by generating spaces for active experimentation and imagination (Kagan, 2010; Whitehead, 2006). Art's potential to provide perspective can support this process by generating an openness to questioning frames of reference and values, which links directly to Mezirow's idea of transformative learning (Mezirow, 2000). Climate-related art projects represent a process of opening up imaginative spaces where audiences can move more freely and reconsider the role of humans as responsible beings with agency and a stake in sustainability transformations. In other words, art can serve as a "principal conduit for cultural renewal" (Galafassi et al., 2018a).

Research suggests the way to trigger rapid, large-scale change involves changing how we approach change itself (O'Brien and Selboe, 2015). Without engaging people with change and enabling them to see their contribution to a bigger picture, it is easy to reach the conclusion that adapting to temperature increases of 4°C or more may be required in the course of this century. People´s active participation using creative, artistic practices can help to overcome psychological barriers and make climate change meaningful for people (Galafassi et al., 2018a). When we see something from a new perspective, problems often become clearer and solutions more visible. Integrating the practical dimensions of change with the political and personal dimensions through transformative learning and art can shift perspectives and potentially empower people to become "systems changers".

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## Competing interests

Karen O'Brien is a co-Founder of cCHANGE, which developed the platform for the ART FOR CHANGE.

## Author contributions

- Contributed to conception and design: JB, KO
- Contributed to acquisition of data: JB
- Contributed to analysis and interpretation of data: JB
- Drafted and/or revised the article: JB, KO
- Approved the submitted version for publication: JB, KO

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