Place-based civic science—collective environmental action and solidarity for eco-resilience

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Background: Educating children and young people (CYP) from marginalized communities about environmental crises poses a unique dilemma as educators strive to prepare them to deal with the climate crisis without compounding the stressors and fear of an unlivable future many already face. We explored how place-based civic science (PBCS) can provide opportunities to engage youth in environmental understanding and action through teamwork in which youth feel that they belong to a group larger than themselves and gain a sense of hope from working with others toward shared goals. We argue that combining PCBS pedagogies of collective action and collaborative learning spaces can help to buffer against distress as CYP grapple with global environmental crises. **Methods:** We drew from qualitative responses (student reflections and public presentations) of 486 6–12th graders (majority students of color) on what they learned from participating in PBCS projects. Projects involved egalitarian partnerships between adults from environmental organizations, teachers and student teams studying and acting together to mitigate problems and presenting their efforts in public venues. **Results:** Students' qualitative responses revealed an identification with their team and its goal forged through the work, respect for their voice, belief in their capacity and confidence to take collective action and even enjoyment of working together to address community concerns. **Conclusions:** PBCS through collective learning/action in student teams and nonhierarchical intergenerational partnerships, and connections that CYP forge with organizations in the broader community, can help to build CYP's agency and efficacy while addressing "emotionally heavy" issues such as climate change.

Key Practitioner Message

- CYP are capable of dealing with environmental problems as long as they see that they can be effective in collective action with fellow stakeholders and that a better environmental future is possible.
- Education that combines learning about environmental problems, with giving young people the chance to build skills and participate in concrete collective actions that address these issues can help CYP to feel they do not have to solve these problems on their own.
- Team building and relationships are an important base for exploring climate change issues, science, and activism, so that students feel safe to explore these issues on their own terms as well as empowered to act in ways that they find culturally relevant.
- There is little research on the mental health effects of climate change on Black, Indigenous, People of Color (BIPOC) young people, and future research should proceed cautiously in light of the potential compounding effects of eco-anxiety added to the challenges these youth face on a daily basis.

Introduction

Globally, children and young people (CYP) experience direct and indirect psychosocial impacts of ecological crises, including eco-anxiety (Marks et al., 2021; Sanson & Burke, 2020). Such eco- anxiety is a reasonable reaction to awareness of the crisis, worries about the current state and future of the planet, and the potential of an unlivable future (Marks et al., 2021; Patel et al., 2021).

Within the United States, research specifically on the mental health effects of climate change on Black, Indigenous and People of Color (BIPOC) CYP is sparse (Patel et al., 2021). However, there is every reason to presume that youth of color from marginalized communities would experience psychosocial effects when confronted with environmental crises, even if they don't name it as eco-anxiety.

The question for educators is how to enable CYP to minimize stress while facing these challenges, which raises ethical issues for educators working with CYP from minoritized communities for whom the threat of an "unlivable future" is not new (Mitchell & Chaudhury, 2020; Ray, 2021). Not only do BIPOC youth shoulder a disproportionate burden of the impacts of environmental issues, they also deal with relentless stressors associated with racism, police brutality, poverty, and failing

educational systems. The ethical dilemma for educators is how to prepare them to deal with the climate crisis without compounding the anxieties of their everyday lives.

In this paper we explore how place-based civic science (PBCS) can educate minoritized youth about environmental challenges while building resilience to face those challenges. We report on what students learn in PBCS projects based on studies conducted over the past seven years in a collaboration between a research university and a regional coalition of teachers and adults from local community-based organizations. The projects emphasized egalitarian partnerships between student teams, teachers, and community partners who studied and acted on local environmental issues, then shared their work in public venues. We drew on qualitative data to investigate how collective learning/action through PBCS may enable marginalized students to understand that they do not face environmental challenges alone and build feelings of efficacy and hope, as well as how this pedagogy might hold promise as one effective way to circumvent eco-anxiety.

PBCS Pedagogy

In PBCS, science is a public good that students and adult partners use to make informed decisions to benefit their communities (Bäckstrand, 2003; Garlick & Levine, 2017). PBCS provides particular benefits for youth who have been marginalized in science (Bang, Warren, Rosebery, & Medin, 2012) and civic education practice (Kahne & Middaugh, 2009). The fact that youth are agents of change dealing with the environmental burdens their communities face means that issues of environmental and social justice will be aired (Radbourne, 2016). At the same time the acts of working in and contributing to their own community through PBCS has been positively associated with youths' socioemotional development including feelings of agency, connection and social capital (Marckini-Polk, Jessup, & Whitmore, 2016). By supporting social and emotional learning (SEL) PBCS can contribute to students' overall psychological strengths that may enable them to understand and manage emotions associated with awareness of the climate catastrophe.

Action to avoid distress

Adults cannot shield youth from knowledge of environmental crises but they can reduce youths' feelings of fear and hopelessness by balancing knowledge with information about and opportunities to engage with others to reduce risks and mitigate environmental harms (Acton & Saxe, 2020; Trott, 2019; Vega, 2019; Wals, 2017). In fact, opportunities for agency and action to address and mitigate stressors are features known to protect against mental health problems (Marks et al., 2021; Sanson & Burke, 2020). It is not surprising, then, that in his meta-analysis Pihkala (2020) found that almost all eco-anxiety scholars emphasize the need for action in education and recommend that programs provide opportunities for young people to participate in problem-solving. If agency and opportunities to contribute to combating environmental degradation can serve as psychological protections (Marks et al., 2021; Sanson & Burke, 2020) it follows that teaching CYP the skills for action, while facilitating experiences for them

to do something concrete to address these issues, can enhance their sense of control.

Collective engagement

In environmental education, the focus on what CYP can do once they are aware of human impact has typically emphasized individual conservation behaviors (Chawla, 2020). However, focusing exclusively on individual action can actually harm mental well-being. Specifically, individuals who believe it is urgent to act and are aware that the problem is larger than they alone can solve, often feel their actions are inadequate (Chawla, 2020; Ojala, 2013). Focusing solely on individual actions can also engender a "hero" identity that is impossible to maintain and can lead to burnout (Vega, 2019). For these reasons scholars concerned about eco-anxiety typically emphasize the need for both individual and collective forms of action (Pihkala, 2020; Rousell & Cutter-Mackenzie-Knowles, 2019; Trott, 2019). In contrast to the unrealistic views of what individuals can accomplish on their own, collective action and engagement can provide CYP with the feeling that 'we are all in this together and are working collectively to do something about it'.

Finding peer support and building community with others

The need to belong to something larger than oneself is a fundamental human motivation (Baumeister & Leary, 1995). So it is not surprising that to avoid/combat eco-anxiety, scholars recommend building supportive environments that offer emotional support, provide a sense of community, and enable participants' views to be heard and respected (Marks et al., 2021; Pihkala, 2020; Sanson & Burke, 2020; Wals, 2017). Research on urban youth engaged in PBCS projects documents the particular benefits of the community environmental contributions CYP are making for their sense of identification with their community (Delia & Krasny, 2017; Flanagan & Gallay, 2014). By engaging in collective environmental action with teams of peers and older generations, youth participating in such projects gain the social trust that Chawla (2020) contends is a pathway toward constructive responses that enable CYP to cope with environmental degradation (Trott, 2019).

Sense of hope and fun

Clayton (2018) has found that focusing on positive emotions helps maintain resilience when facing the threats of climate change. Positive emotions also are invoked by Pihkala (2020) who in a meta-analysis concluded that the responsive use of humor helps strengthen resilience and that "opportunities should be given for joy" (p. 25). Finally, communications scholars emphasize that effective climate communication with the public should balance constructive doubt (e.g., the reality of the threat) with constructive hope (Marlon et al., 2019).

Taken together, these studies suggest that to responsibly engage youth in addressing the degradation of the environment, it is important that pedagogical spaces be permeated by joy and hope (Freire, 1998) and build in "emotionally light" teaching and learning experiences where students feel recognized by the group and have fun doing the work. When CYP have their basic human needs for safety, belonging, and dignity met (Maslow, 1943), they should be better prepared to think about

and address "emotionally heavy" topics like climate change.

Methods

Sample

In the PBCS model discussed in this paper, students learned about environmental issues of public consequence and worked with others to do something about them, with an emphasis on interdependence and the links between environmental and human health and well-being. This model links schools with community partners and science with civic action. Students learned core content and worked collectively to apply what they learned to address environmental issues threatening their communities.

All projects were part of the Southeast Michigan Stewardship Coalition (SEMIS), a regional coalition of place-based stewardship education (PBSE) that recruits teachers and adult community partners to engage students in PBSE. Data were drawn from a long-term body of work (2014–2020) documenting what students learn from participating in this model of PBSE, which we refer to as PBCS projects. In this paper, we draw from the qualitative responses of students on what they learned from participating in these projects. We analyzed (a) written reflections for all students participating in these projects; (b) written reflections for a subset of these students who participated in an annual community forum in which they presented their work; and (c) recorded public presentations from one PBCS project focused on climate resiliency. All students attended one of seven schools in two urban metropolitan areas, serving students from low-income and working-class families, 76% - 86% of whom were eligible for free and reduced-cost lunch.[1] Data were collected from 486 6th–12th graders (ages 12–18), the majority of whom (76%) were high school students (9th–12th grade). Based on student self-reports, 59% identified as Black, 17% Latinx, 6% White, 1% Asian, 14% mixed race/ethnicity, and 3% other. Fifty-three percent of our participants identified as female, 45% identified as male, 1% identified with another gender identity and the rest chose not to answer.

Student PBCS projects took place over the course of a semester or year, as part of their regular school based classes led by teachers ($N = 11$) who self-selected into the SEMIS Coalition, with project content guided by teachers in roughly half of the projects, and student driven in the other projects. Students who participated in the community forum were selected by their teachers to represent their class's work in this public forum, while students participating in the public presentations we analyzed self-selected into the conference presentations.

The content of student projects discussed in this paper included students' reclaiming abandoned buildings and converting the land into public park spaces, applying green infrastructure solutions to reduce stormwater runoff, cataloging ecosystem services and implementing tree plantings, addressing food injustice and sustainable farming practices through community gardens, investigating and educating community members on air quality and the impacts of pollution from nearby industry, conducting school energy audits and investigating solar energy systems, and addressing community resiliency in the face of climate change.

Measures

Students who participated in SEMIS projects from 2014–2019 completed open-ended reflective essays about their work and learning after their projects. We analyzed students' responses ($N = 452$) to one of the following reflection prompts: "Was there anything you learned in the project that you could use to help your community (or people in your community)?" and to "[Tell us] why = you think the work you did in the [project specific] project was important – What did you learn about your community, other people or species in your community or the environment from the work you did?, What did you learn about what kids can do to solve environmental problems in their communities?"

Additionally, we analyzed the reflections of a subset of students ($N = 27$) who participated in the community forum event, addressing prompts specific to this experience: "How did it feel to represent the work that your class did?, What was it like for you to share your work with other students and adults?, What was it like coming together with students from different schools at a community forum like this?" Finally, we analyzed two student led recorded public conference presentations ($N=7$) intended to showcase student experiences and learning from their projects.

Analyses

Students' Written Reflections. The initial purpose of the body of work reported in this paper was to explore students' learning and dispositions associated with their participation in civic science projects rather than to analyze PBCS as an intervention to diminish eco-anxiety. To analyze students' reflections one of the paper's authors and graduate student assistants used an inductive approach to generate an initial list of emerging substantive categories, including those relevant to this paper: youth/adult relationships/working in teams, civic engagement, students working collectively, self-identification as an expert, recognition by the community, sense of agency/efficacy, an understanding of the positive or negative impacts people can have on the environment, and awareness of environmental protection. A total of 26 categories captured all of the students' responses across the studies reported here (see Gallay, Pykett, Smallwood, & Flanagan, 2020 and Gallay, Flanagan, & Parker, 2021 for additional details). Each reflective essay could be assigned up to eight codes and thus individual students' responses were counted in more than one coding category. Based on assignment of responses to the set of categories noted above, a coding agreement rate of 87% was achieved. The authors of this paper used a deductive approach within the 26 discrete codes to categorize what students said they learned, collapsing some of the original 26 codes into seven themes relevant to this paper. Table 1 summarizes these seven categories and the percentage of responses coded in each category.

Students' recorded public presentations. Recordings of the two public presentations were coded by the second author through a sequence of: watching recordings, reading the video transcripts, writing memos on emerging themes, and categorizing responses to capture aspects of resilience and protection from eco-anxiety, following the seven relevant themes coded for in the analysis of written reflections.

Results

We report here on students' responses that point to the sense of efficacy and resilience gained through these projects, the knowledge gained of humans' positive and negative impact on the environment, and the pedagogical practices that helped build the skills necessary to face and address environmental problems.[2]

Awareness of negative human impact

As might be expected in projects where students address environmental problems in their communities, many students' responses referenced an understanding of the ways that people's actions harm the environment. This included both individual behaviors, "People pollute our lakes or throw junk in the rivers" and institutional or systemic impacts, "I learned what the incinerator is and how harmful it is to the earth."

While students noted that their participation in these civic science projects made them aware of human inaction ("Pollution can be stopped by us people, but we choose not to") and intentional harmful behavior, such references did not include language indicating anxiety or distress. Rather the lack of care shown by others was

Table 1. Coding categories and descriptions

Code title	Description	% of Students responding
1. Negative Human Impact	Negative human impact on the environment or community: general ways that people's actions harm the environment, individual actions and systemic/structural impacts.	23.67
2. Collective Nature/Need/Ability	The collective nature of the work and need for collective action to address environmental issues.	20.35
5. Generativity/Leadership	Being an example to others, sharing ideas, and leaving a positive legacy.	38.71
6. Efficacy/Empowerment /Agency	The belief in one's ability to impact change in the environment/community or feelings of confidence and power taking action.	43.36
7. Civic Learning and Action	Response referenced developing civic skills, learning of the processes of democratic action and challenging the system or those in power, changing policies or systematic practices.	19.69
4. Membership/solidarity/connection	Solidarity or a personal relationship with, or membership in a group, community or place, including references to partnerships and teamwork.	21.01
3. Positive Human Impact	Positive human impact on the environment or community, including specific actions humans or the individual can/does do to improve/help the environment.	43.36

viewed as a cause for concern, but also as a call to action: "Now, I can inform people of how bad our air is and why it's so bad. Maybe if more people know, we can all help out our earth and make it better." Awareness of issues as big as climate change were connected with solutions as captured in the following quote: "We learned about the use of solar panels... The use of solar panels will save the world in its time of crisis (global warming)... [We're] coming close to a time when global warming has an effect a lot. Places are flooding some more frequently than other. Yet, if we get in front of this problem/get ahead of it will succeed and beat this problem."

Agency and efficacy
Students invoked themes of agency and efficacy in four of the coding categories: Efficacy/Empowerment /Agency; Collective Nature of Work/Need/Ability; Generativity/ Leadership; and Civic Learning and Action. Many students mentioned the importance of combining learning about environmental issues with action to address them. For example, one student observed: "People should do something instead of just learning about it."

Some students said the connection of projects to their own experiences and knowing others directly impacted by the issues was important to their sense of efficacy: "We talked a lot about how we would experience lots of flooding in our basements in one night. We basically brought our own personal stories to it because that makes it even more personal to you, and it makes it more effective to be engaged." Student responses also indicated that youth gain a sense of agency by doing something to address the problems their communities face. As evident in the following student's response, some youth mention their potential as community leaders, which may be especially empowering for minoritized youth who have been marginalized from the mainstream: "I learned to be a leader... I learned about how the incinerator and [oil refinery] plant affect our health and community... I learned that I should stand up when someone or something is threatening my community and health."

Agency, as reflected in students' responses, transferred to their ability to be exemplars for others in the community. One student shared that the program changed how she engages family and friends: "In class we learned about people (some kids) who are solving community problems. When we talk about this to our families and friends they become more aware about how they can help the environment." Additionally, some students showcased how this awareness of their newfound expertise extended to their capacity to lead others: "It motivates people. If people see what you do, they will come together-family, relatives, etc., come together.... I have a powerful voice. I want to be a spokesperson- form a group or an organization." Insofar as the periods of childhood and youth are formative, the efficacy students feel from having a voice in addressing environmental problems can be a foundation for the future roles they envision, as noted in the following student's quote: "I learned that if there is a problem, speaking up about it can go a long way, with this knowledge and enough people on my side, I would have the potential to tackle some big issues."

Feelings of efficacy also were revealed through an awareness of their ability as young people to effect change: "I learned kids can do just as much or even more than adults when it comes to bettering their community seeming as though the community will ultimately thrive off the work the 'kids' end up doing." Others brought up their agency in relationships with people in power, such as the student responding "You can get more powerful people involved. I mean we're just teens right now. We have a little bit of power but there's more people who have higher power than us. We can get them to come join us. I mean like strength in numbers."

Some references to "kids' power" alluded to the capacities of CYP to reach out to and work with others: "It was important because it shows that kids know about problems and they can work with others... I think people now know how they can change environmental problems with others."

Echoing the comments of researchers who study eco-anxiety, students expressed the positive feelings they gained from experiencing agency via their contributions to their community: "I feel good about doing something like that...it felt like I was like a great person for helping out something."

Membership, solidarity and connection

As we have pointed out, students accomplished their civic science projects through teamwork with peers and in collaboration with adult community partners. However, neither students' attention nor the reflection prompts specifically focused on collaboration, groups or teamwork. So it was notable that, when students were asked to reflect on what they learned, more than 21% of the responses mentioned that they learned something about being a member of groups – either feelings of solidarity with their peers or team and/or the partnership between their class and the adult community partners that provided a context where they felt heard.

For some, the bonds felt through the work expanded to identification with other groups larger than themselves such as the following student who said that the project was "Where I met everybody and that's how I got really, really into the school and deep in my roots and out into the community." Others addressed how they gained a sense of solidarity with peers working toward shared goals, because of the collective nature of the work: "After this project I feel closer more connected to my class. We didn't work individual. We worked as a team. What I learned through this project is that my class isn't just a class [we're] a family."

In students' written reflections collected after they presented at the community forum, responses indicated the potential of such experiences for youth gaining a larger sense of solidarity as articulated in the following reflection: "Seeing kids with similar problems to the ones I have in my community made an impact on me because for a second I thought the major environmental problems were only in my area but now I realize they are everywhere." This knowledge can help students identify with being part of a movement with a larger purpose, and realize that they are not alone in addressing environmental challenges. Student responses also referenced the egalitarian partnerships they experienced with their teachers and adult community educators. One student noted that the projects created the opportunity to listen to adults speak about climate change and also have their own voices heard and respected: "We got to just ask questions without feeling judged or feeling stupid like for not knowing it... So we basically got to learn and from each other too." Another addressed the importance of these relationships in creating a supportive space for students: "It wasn't like they [adult leaders] were just strangers coming in and we wouldn't really like speak a word to them... We would all say hello and be able to have a natural conversation" Student comments also reflected on relationships for pedagogical practice. In response to a question during a public presentation about what advice youth have for teachers who implement this kind of civic science work, one student replied that their leaders "Gave us a lot of space to contribute with our thoughts and opinions. They would constantly ask questions and 'how do you feel about this? How do you go about changing that'? So I thought that was really good and important."

Hope from positive human impact, fun, joy, and humor

The realization that they were part of a larger community dedicated to protecting the natural environment was articulated in some students' reflections as a reason for optimism and hope. For many, participating in these PBCS projects was their first exposure to what others were doing to address environmental issues: "I didn't really think a lot of people focused on like, the environment how the water stays clean, ways to help stop floods and all that stuff... I didn't think so many people focused on that and I didn't think people were actually trying to do something about the problem." In some cases, this gave students a positive view of their community and fellow citizens, as one noted "I learned that my community wants to keep our environment and people safe and healthy. My community wants to help and protect people that have [diseases] like asthma, cancer, and more. My community wants to help the plants and animals and humans to have water, a home, and food." This larger sense of community was often heard in students' reflections about participating in the community forum. As one student noted, the event nurtured an awareness that their projects and work were part of a larger collective environmental effort: "I learned that a lot more people care about the community than I thought before. And that there are organizations that have youth talk and express how they feel and set their voice out there to be heard to all that will listen."

Another student exemplifies the reinforcement and optimism such knowledge can bring:

"I'm actually like relieved from this whole experience that it's like, I know that it's out there. Like even with the conference that we had yesterday, this is one big relief for me. Like now that I know that there's kids out there... It just made me happy cause it's like, 'thank you' that there's kids that's out there that's actually aiming for something with a purpose behind it. That's really a big thing for me."

In reflecting on the community forum experience, students mentioned a myriad of positive feelings, such as the sense of personal empowerment and respect and inspiration felt for peers, as expressed in the following: "It felt empowering to teach others and to hear what others had to say. The students I watched present have given and will give so much to their community... I was not aware of how much of an impact this made and how big of a deal it was." For many, the experience of publicly speaking about their work helped them feel recognized and heard: "It also made me feel good that I could actually inspire someone or somebody to change their ways and help. Also to know other people felt the way I felt." Other students articulated that this experience helped them feel a sense of hope for the future "Coming together from different schools like this makes me feel like that everyone can work together and really take things to another level."

For some, the group solidarity and action in these PBCS projects even brought a sense of joy from working together to address community concerns: "It was fun for me. My experience ... was awesome because I got to meet like, I got to get closer to people that I would never talk to. And, once we got developed that bond ... It was more open for everybody to help each other out. So, it was fun to work with people."

The sense that environmental civic engagement itself is something to be enjoyed, was mentioned in one student's reflection: "It's like, you can do way more stuff and have fun with it. I mean, you don't always have to go to the parties or go out and stuff. You can do other stuff in the community like how we are doing this project. It's fun." Having fun as a team and monitoring their team's emotions was summarized by this last student: "We

would talk about how we were feeling according to the weather. So if we think sad or tired is cloudy. It was really fun." Later, this same youth suggested that students should have more free time in classrooms to know all the classmates so that they "can be comfortable with each other and have fun making memories."

Discussion

To build resistance against climate anxiety, CYP need opportunities to act to minimize the crisis in solidarity with others who validate them and share a sense of hope that their collective work can make a difference (Marks et al., 2021). We believe that the sense of agency and efficacy, capacities to work in teams, and to have fun in the process that students articulated as learnings from these civic science projects points to the potential of this model for CYP to build resilience and avoid distress when confronting environmental issues. The elements of the PBCS model we have outlined may be especially important in educational programs with marginalized groups, for whom the threat of an "unlivable future" is not new (Ray, 2021).

The very essence of civic science is that ordinary citizens have a voice in deciding how to mitigate environmental harm, an element needed in climate change education (Filho & Hemstock, 2019; Rousell & Cutter-Mackenzie-Knowles, 2019). As researchers studying eco-anxiety have cautioned, learning about climate change without opportunities to do something can make the enormity of the crisis overwhelming and thus contribute to anxiety and worry (Trott, 2019; Wals, 2017). Students' responses were replete with examples of the sense of empowerment they gained through having a voice and acting in ways that benefitted their communities.

Because the enormity of the climate crisis can be overwhelming when faced alone, the team structure (with peers and across generations with community partners) of these civic science projects is another element that should deflect eco-anxiety by building trust in the collective agency of their community to tackle even large-scale problems (Chawla, 2020).

That team element was key to students' social–emotional learning and identity formation: students noted how much their group formed an identity through the work, how they got to know one another, and how these experiences of group formation made them feel heard and appreciated. The connections that CYP forged with organizations in the broader community also helped to build a positive outlook for solving environmental dilemmas. The egalitarian structure of the intergenerational partnerships reduced power asymmetries and enabled students to speak up and be heard.

Finally, through collective action with their team, students gained a sense of optimism and hope for the future. Learning to work with others toward the goal of sustaining their shared environment builds social trust, which is critical for constructive hope in the face of climate change (Ojala, 2017), supports further action and helps people to be emotionally resilient (Clayton, 2018; Marlon et al., 2019).

Limitations and implications for further research

The studies this paper is based on were not framed around eco-anxiety and we do not have direct evidence that participation in these projects reduced distress. There is little research on the mental health effects of climate change on BIPOC young people (Patel et al., 2021) and future research should proceed cautiously in light of the potential compounding effects of eco-anxiety added to the challenges these youth face on a daily basis. Although students did not mention distress in their reflections, the fact that many mentioned negative human impact suggests that they could have felt some negative emotions. Future studies using open-ended formats could incorporate interviews with subgroups to probe whether negative emotions accompany awareness of the harm done by humans. Further, quantitative studies with more representative samples are needed to determine the degree to which the elements of PBCS outlined here could be effective in minimizing eco-anxiety with different groups of CYP. Finally, although the participants were from minoritized communities, the study was conducted in North America.

Future studies should assess whether civic science pedagogies might be impactful in the majority world.

Conclusion

In this article, we explore place-based civic science as a pedagogy for engaging CYP from marginalized communities in learning about and addressing the climate crisis and other environmental degradation. It is a fact that CYP are growing up in a world where they will have to face these challenges. These realities put young people at risk for anxiety and depression. We argue that to avoid distress, educational interventions should include opportunities to engage youth in environmental understanding and action in collaborative group settings that involve teamwork, a sense of solidarity, and a feeling that they are part of a group with a purpose that is larger than themselves. Our work suggests that CYP are capable of dealing with environmental problems as long as they see that they can be effective in collective action with fellow stakeholders and that a better environmental future is possible.

As one of the students in this study mentioned in reflecting on the collective action efforts of their class: "Climate change is real, it is happening right now... It does feel great [to address it]".

Ethical information

The studies reported in this article were completed as an evaluation in collaboration with the SEMIS Coalition, who has permission to conduct programming and evaluation in the schools. Studies were reviewed by the University of Wisconsin Education and Social/behavioral Science Institutional Review Board and the IRB determined that the project is evaluation and does not constitute research as defined in 45 CFR 46.102(d). While parental consent was not required, we have followed ethical considerations in informing participants of the study, obtaining verbal assent, and maintaining confidentiality of all participants.

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Notes

1 In the United States, students are eligible for a free or reduced-cost lunch provided by the school if their family's income falls below 185% of the federal poverty level

2 All written material from students is presented verbatim, including the use of African American Vernacular English and spelling and grammatical errors, unless the meaning is unclear, or identifiable information is shared, as indicated by [...].

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