Journal of Sustainability Education
Vol. 29, March 2024
ISSN: 2151-7452

Using the Community Park Audit Tool to Teach the Importance of Urban Green Spaces: A Case Study with Teacher Education and Public Health Students

Katie Bucher, Muhlenberg College, katiebucher@muhlenberg.edu
Russell McIntire, Lehigh University, rum222@lehigh.edu

Abstract: This case study discusses the implementation of a park audit project with undergraduate college students in teacher education and public health programs. With a focus on drawing attention to the importance of urban green spaces in these two professional fields, the design of this project extended course activities into local parks. Students prepared to conduct park audits by engaging with course material focused on the importance of urban green spaces for individual health and children's development, as well as inequities in access to high quality parks. The capstone of the course project was the audit of parks using the Community Parks Audit Tool (CPAT) in which each student assessed several parks in their local communities and documented their findings. This article discusses the contextual relevance of this project, its value in increasing attention to environmental considerations in the education and public health fields, as well as student responses to the implementation of the project in these specific classes.

Keywords: Urban green spaces, park inequities, experiential learning, teacher education, public health

Katie Bucher is an Associate Professor of education at Muhlenberg College in Allentown, PA, and former faculty at Community College of Philadelphia. She teaches courses in educational psychology and social foundations of education in which she integrates environmental education content and experiences for pre-service teachers.

Russell McIntire is an Associate Professor in the College of Health at Lehigh University. His research identifies the social, behavioral and geographic factors that impact people's health where they live, work, and play. His major research interests include healthy parks, gardening and greening interventions, mental health, and cancer prevention. He teaches public health classes in epidemiology and environmental health.

Introduction

This article discusses a project focused on engaging college students in auditing urban green spaces and understanding the importance of urban green spaces within the fields of early childhood education and public health. We conducted this project with two groups of undergraduate students: 1) first- and second-year teacher education students at a community college in a large city and, 2) third- and fourth-year public health students at a four-year university in a small city. (The two groups of students were Birth-4th Grade Education majors and Population Health majors, respectively. For ease of reading, we will be using the terms "teacher education" and "public health" throughout this paper.) In the two courses in which we implemented this project, we had parallel goals of increasing students' awareness of local urban green spaces; reflection on green space inequities; and appreciation for the importance of green spaces in their respective professional fields.

The impetus for this project is rooted in a desire to integrate attention to environmentalism and sustainability across college curricular content. In its 2022 call for institutes of higher education to embrace the 2030 Agenda for Sustainable Development Goals, UNESCO noted that "sustainability education should bring students into contact with real-world problems and immersive experiences" that inspire them to meet the responsibilities of critical societal transformation (pg. 12 in Parr et al., 2022). How- or even whether- institutes of higher education are meeting this call varies greatly, by location/region, type of institution, and disciplinary field of study (Parr et al., 2022).

In the two professional fields students in our courses are entering- teaching and public health- there has been notable increased attention to environmental challenges such as the climate crisis and responsive sustainability in recent years (Hedefalk et al., 2015; Reid, 2019; Kluge et al., 2023). Nonetheless, there remains considerable room for progress so that educators (Drewes et al., 2018; Reid, 2019) and public health professionals (Hathaway & Maibach, 2018) are aware of how the natural environment and pressing environmental challenges intersect with their work. Through a parallel project in an early childhood education and a public health course, we focused on addressing one aspect of this need.

The Importance of Nature to Early Childhood Education and Public Health

In recent years there has been a proliferation of research documenting the benefits of children's engagement in and with nature as well as the potential for broader eco-social change when children develop pro-environmental ethics and behaviors (Cheng & Monroe, 2012; Collado & Corraliza, 2015; Collado et al., 2015; Rosa et al., 2018; Hoover, 2021). In their systematic review of the research literature in early childhood environmental education (ECEE), Ardoin and Bowers (2020) summarized the benefits of environmental programming for young children. The authors concluded:

> Our review suggests that ECEE encourages young children affectively, in terms of exploring the environment, bolstering their sense of self-confidence, and making social

> connections with each other; developing cognitive frameworks for understanding the natural world; and laying the groundwork for skills and dispositions related to taking action to improve and protect the environment (pg. 12-13 in Ardoin & Bowers, 2020).

Findings such as these, coupled with acknowledgement of early childhood as a particularly crucial period for developing environmental literacy as well as pro-environmental attitudes and behaviors, have motivated research and the practice of environmental education within early childhood education (Ardoin & Bowers, 2020). Indeed, a March 2023 publication from the National Association for the Education of Young Children (NAEYC) stated, "when it comes to climate, the environment, and young children, a movement seems to be growing" (para. 2, Lombardi, 2023).

Foundationally, early childhood educators need to be able to take young children *into* the natural environment so that they learn and benefit *from* and *through* nature and, hopefully, develop pro-environmental understandings, attitudes, behaviors (Moore & Wong, 1997; Orr, 2004; Gaylie, 2009; Louv, 2008; Cheng & Monroe, 2012; Collado & Corraliza, 2015; Collado et al., 2015; Rosa et al., 2018; Hoover, 2021). Many of the benefits of children's personal experiences with green spaces have implications not just for teachers but for public health professionals as well. For example, research shows that children who have access to quality green space not only have better educational outcomes (Requia et al., 2022) but also improved health outcomes, (Vanaken & Danckaerts, 2018; McCormick, 2017). A growing body of literature has identified strong connections between green spaces and children's mental (Vanaken & Danckaerts, 2018; Wendelboe-Nelson et al., 2029) and physical health (Kondo, et al., 2018).

Notably, researchers hypothesize that green space exhibits an equigenic effect on the health of populations- this means that it fosters health equity. In practice, this means that although green spaces benefit the health of all people, they may benefit the health of the most vulnerable populations the greatest (Kondo, et al., 2022). For example, children who experience chronic stress are particularly benefited through green space experiences as "contact with nature can help mitigate the negative effects of stress and can help boost resilience" (para. 2, Delvecchio et al., 2021). This means that the protective or "buffering effects" of green spaces may be strongest for the most vulnerable children (Wells & Evans, 2003). Although not all studies have confirmed the equigenic hypothesis (Moran, et al., 2021), it is clear that green spaces are key to reducing health disparities and building community resilience to the imminent social and ecological changes resulting from climate change.

Course Projects

With the critical urgency to increase environmental awareness and competencies among professionals in our disciplinary fields, we began this project with an interest in engaging college students in ways that were personally meaningful and locally relevant. We hoped to draw attention to concerns about urban green spaces, in particular awareness of inequities in access and quality. But we also hoped to support students' consideration of community green spaces (even imperfect ones) as important resources for their (future) professional work, in particular the potential for urban green spaces to especially benefit socio-economically disadvantaged popula-

tions. We hoped students would gain insight into the ways they could use green spaces as positive resources in their professional work.

Within the framework of these goals, we started this project with several questions of interest:

- What perceptions do students have about the importance of quality urban green spaces to child-development and health, respectively?
- What perceptions do students have about whether and/or how they can use urban green spaces in their (future) work as teachers and public-health professionals?

For the teacher education students at the community college, we developed course content focused on the developmental benefits of nature play and outdoor education for young children. In particular, students read about and discussed why outdoor activities and nature play are important for children's healthy development and what types of green spaces support positive engagement in such activities and play. Key readings included Richard Louv's *Last Child in the Woods* (2008) as well as documentation by NAEYC and child development researchers about the importance of access to nature and nature activities for young children, particularly children from under-resourced communities and children experiencing chronic toxic stress.

For the public health students at the four-year university, the class focused on teaching epidemiologic methods so students could understand how to measure demographic, societal, environmental, behavioral, and health factors that impact the health of populations. Readings focused on how to design research studies to 1) measure the burden of disease, 2) test hypotheses about relationships between health factors, and 3) reduce the impact of bias. Readings also covered topical content such as environmental health, the built-environment, health disparities, and health policy.

In both courses, the centerpiece of the semester project was an experiential learning opportunity in which students conducted audits of parks in their local communities. For our two courses, we selected the Community Park Audit Tool (CPAT) to guide students' engagement with local green spaces. While originally developed to reliably audit community parks for their potential to support physical activity (Kaczynki, et al., 2012)- not necessarily our primary interest of focus- we selected the CPAT for several qualities. Most especially, the CPAT is user-friendly; comprehensive yet accessible and understandable to youth as well as adults; it is well-organized; and can be completed in an hour or less. The tool contains four sections: park information, access and surrounding neighborhood, park facilities, and park quality and safety. Together, these four sections are intended to "capture the presence, condition, and usability of important elements within a park and its surrounding community" (pg. 110, Gallerani et al., 2017). Similar to the developers of the CPAT, we hoped that auditing parks in students' local communities would "facilitate greater engagement… in considering, evaluating, and advocating for improved parks and overall healthy community design" (pg. 247, Kaczynski, et al., 2012) among future professionals in the fields of early childhood education and public health.

To make the park audit experience relevant for students, we engaged them in a cycle of dialogue about background content; direct engagement through using the CPAT; and reflection (written and dialogic) after their park evaluations. Throughout the project students were encouraged- and provided extensive opportunities during class- to ask questions, consider connections to course content, and share personal experiences with their peers and the instructor. We hoped that students would engage with this project as they might as a practicing professional, that is, that the experiential nature of these course activities would bring "real world" challenges and opportunities regarding environmental resources and engagement to the forefront of their development as teacher/public health professionals.

Survey Results

To provide insights into the impact of the course project on students' perceptions as well as their personal experiences with the project, we conducted (voluntary) pre-surveys at the beginning of the semester and (voluntary) post-surveys after project completion. In both pre- and post-surveys, we asked questions about students' understanding of the importance of green spaces for health and child development; personal intentions to use green spaces in their future work as teachers or public health professionals; and their personal intentions to advocate for high quality green spaces. Students responded to each question using a Likert-type scale. We assigned scores reflecting agreement with statements based on the Likert scale: "Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4)." We calculated and reported the mean score per item.

As shown in the Table below, in both courses students showed a greater awareness of the importance of green spaces to children's development and individual health and a greater interest and intention to both use and advocate for high quality green spaces after the completion of the course project.

ISSN: 2151-7452

Table 1: Pre- and Post-activity survey responses among students in teacher education (n = 15) and epidemiology classes (n = 7)

Survey Item	Pre-Survey: Mean Score (n)[a]	Standard Deviation	Post-Survey: Mean Score (n)	Standard Deviation
Nature/green spaces are important for children's development[b]	3.75 (8)	0.46	3.89 (9)	0.33
I plan to use nature activities/ green spaces in my work as a classroom teacher[b]	3.38 (8)	0.52	3.63 (8)	0.52
Nature/green spaces are important for people's health[c]	3.67 (3)	0.58	3.83 (6)	0.41
I plan to use my knowledge of the relationships between green spaces and health in my future career[c]	2.33 (3)	0.58	3.17 (6)	0.75
I plan to advocate for high quality parks in my community	2.67 (12)	0.79	3.00 (12)	0.43

[a] n does not include missing values, or responses from students who were not asked the item
[b] Only asked among teacher education students
[c] Only asked among epidemiology students

In addition, we solicited qualitative responses from students to gain insight into the value and impact of this course project on their perceptions and professional intentions. In response to the question, "Has the community parks assignment changed your perspective about parks? If yes, how?", most students responded that conducting the park audit increased their perception of the importance of parks for children's development and/or individual health.[1] Some students noted that the project supported their general understanding that parks promote health and/or well-being, examples included; "the benefits of having outdoor green spaces for physical and mental

[1] The exception to this was one teacher education student who noted "already" understanding the importance of green spaces for children's development, so the project did not change this student's perceptions related to this question.

health," "the importance of having a safe, inviting park for children," and "the health benefits to accessing safe and quality green spaces." One student also responded more specifically that "the assignment really let me see parks as a way for kids to have a community. Instead of being online all day, kids can meet new peers at (the) park and I feel like it's the safest way to make new friends." Some students also commented on their increased attention to equitable access to high quality urban green spaces. For example, one student noted, "now I'm looking for the amount of trash cans, the safety of the park, etc." while another student commented, "I noticed not a lot of parks in the (location) area are accessible for children," and another commented that "it was eye opening to see… that some places are worse than I initially thought."

Lastly, in the post-survey we asked students to describe what the community parks assignment was like for them as a personal experience. In response to this question, some students noted how the project connected them more to green spaces in their home community. For example, one student noted, "I really enjoyed observing the parks I chose. Since visiting those parks, I have a different outlook on parks in my neighborhood." Other students commented on how they enjoyed the applications to their professional field. For example, one student wrote, "I really enjoyed this assignment because it gave us opportunities to apply our knowledge with real fieldwork. I especially enjoyed going out and auditing the parks," while another student wrote that "It was very hands-on in terms of using the CPAT as well as running statistical analysis…to get a better understanding of how park indicators impact neighborhood health outcomes." In addition, some students commented that they enjoyed the park audit simply for the activity itself. For example, one student commented, "it gave me a chance to go to a park and walk and sit, enjoy the view and fresh air. I don't get a chance to go to a park alone and just enjoy me time and relax."

Discussion

In designing this course project, we hoped to increase students' awareness of urban green spaces; both the inequities in quality of green spaces in their surrounding communities and the possibilities for using urban green spaces in their work as teachers and public health professionals. This goal was rooted in the foundational importance of environmental considerations in the early childhood education and public health fields and the relatively limited exposure that most students have to such content in their undergraduate training.

In particular, given the benefits to children's healthy development and broader societal goals towards sustainability, it is critical that pre-service teachers engage with the concepts of environmental education for their future classroom work (Nousheen, et al., 2020; Merritt, et al., 2018; Warren, et al., 2014) and, more specifically, to consider green spaces as integral to high quality programming for young children (Sugar, 2021; Vidal & Seixas, 2022; Russo & Andreucci, 2023). Unfortunately, most pre-service and practicing teachers are not required to take a course on environmental education or education for sustainability and are largely not prepared to integrate this content and these approaches into their teaching (Merritt et al., 2018; Will, 2022). This means that teachers are often not aware of something as foundational as the importance of green space to children's development or the specific benefits green spaces provide less advantaged children (Children & Nature Network, 2020).

Similarly, while traditional undergraduate public health programs do require courses in environmental health (Gebo, 2008) and many offer majors or have departments of environmental health (Resnick, et al., 2018), students in health practitioner training programs may not get any environmental education. Studies reporting the content of medical education show that environmental health is largely omitted (Gehle, 2011). Further, changes to public health accreditation requirements have contributed to fewer environmental health classes offered in Master of Public Health programs. In 2016, the Council on Education for Public Health, the main US accrediting body for schools and programs of public health, replaced the requirement that programs provide classes in the five public health core areas (biostatistics, epidemiology, environmental health sciences, health services administration, and social and behavioral sciences) with competency-based requirements. In subsequent years, fewer environmental health concentrations and classes were offered (Levy et al., 2022). It is not surprising, therefore, that while healthcare and public health workers acknowledge the importance of the environment to health and support environmental policy changes, confidence in talking about environmental health issues is low, especially among practitioners (Brown, et al., 2019). Clearly, there is a need for expanded environmental education among healthcare and public health professionals in order to more effectively protect the health of populations from emerging environmental threats (Kreslake, 2018).

Conclusion

In a small and specific way, the course project discussed in this case study aimed to meet UNESCO's call for a focus on sustainability in higher education by engaging students in a community park audit project. Students in both courses were enrolled in college programs tied to particular professions in education and public health, both fields where the detrimental impacts of global climate change play out at the personal and societal levels but, also, where there is considerable space for the dissemination of information and advocacy towards positive change. In particular, in both courses we framed current environmental challenges through the lens of equity, drawing attention to the ways that environmental crises impact different communities in disparate ways and, conversely, the immense potential for access to quality green spaces to especially benefit the most vulnerable populations. Through use of the Community Parks Audit Tool and related course readings and discussion, this project engaged students to see the real-world environmental challenges, responsibilities, and opportunities in their future professional endeavors.

References

Ardoin, N. M., & Bowers, A. W. (2020). Early childhood environmental education: A systematic review of the research literature. *Educational Research Review*, *31,* https://doi.org/10.1016/j.edurev.2020.100353.

Brown, P., Clark, S., Zimmerman, E., Valenti, M., Miller, M.D. (2019). Health Professionals' Environmental Health Literacy. In: S. Finn & L. O'Fallon, L. (Eds.), *Environmental health literacy*. Springer, Cham. https://doi.org/10.1007/978-3-319-94108-0_8

Cheng, J. C. H., & Monroe, M. C. (2012). Connection to nature: Children's affective attitude toward nature. *Environment and behavior*, *44*(1), 31-49. https://doi.org/10.1177/001391651038508

Children & Nature Network (2020). The equigenic effect: How nature access can level the playing field for children. *Finding Nature News*, 9/2020. Retrieved July 28, 2023, from https://www.childrenandnature.org/resources/the-equigenic-effect-how-nature-access-can-level-the-playing-field-for-children/#:~:text=Equigenesis%20is%20a%20term%20that,economic%20status%20groups%20more%20equal.

Collado, S., & Corraliza, J. A. (2015). Children's Restorative Experiences and Self-Reported Environmental Behaviors. *Environment and Behavior*, *47*(1), 38-56. https://doi.org/10.1177/0013916513492417

Collado, S., Corraliza, J. A., Staats, H., & Ruiz, M. (2015). Effect of frequency and mode of contact with nature on children's self-reported ecological behaviors. *Journal of Environmental Psychology*, *41*, 65-73. https://doi.org/10.1016/j.jenvp.2014.11.001

Delvecchio, B.L., Ferguson, S., Knapp, W. (2021). Using nature contact to support children under stress. *Teaching Young Children*, 15(1): NAEYC: https://www.naeyc.org/resources/pubs/tyc/fall2021/nature-support-children-stress.

Drewes, A., Henderson, J., & Mouza, C. (2018). Professional development design considerations in climate change education: teacher enactment and student learning. *International Journal of Science Education*, *40*(1), 67-89. https://doi.org/10.1080/09500693.2017.1397798

Gallerani, D. G., Besenyi, G. M., Stanis, S. A. W., & Kaczynski, A. T. (2017). "We actually care and we want to make the parks better": A qualitative study of youth experiences and perceptions after conducting park audits. *Preventive Medicine*, *95*, S109-S114. https://doi.org/10.1016/j.ypmed.2016.08.043

Gaylie, V. (2009). *The learning garden: Ecology, teaching, and transformation*. New York: Peter Lang.

Gebo, K. A., Goodyear, J. D., David, S. R., & Yager, J. D. (2008). From the Schools of Public Health: On academics: Public health studies as an undergraduate major. *Public Health Reports*, *123*(6), 812-817. https://doi.org/10.1177/003335490812300620

Gehle, K. S., Crawford, J. L., & Hatcher, M. T. (2011). Integrating environmental health into medical education. *American Journal of Preventive Medicine*, *41*(4), S296-S301. https://doi.org/10.1016/j.amepre.2011.06.007.

Hathaway, J., & Maibach, E. W. (2018). Health implications of climate change: a review of the literature about the perception of the public and health professionals. *Current Environmental Health Reports*, *5*(1), 197-204. 10.1007/s40572-018-0190-3

Hedefalk, M., Almqvist, J., & Östman, L. (2015). Education for sustainable development in early childhood education: A review of the research literature. *Environmental Education Research*, *21*(7), 975-990. DOI:10.1080/13504622.2014.971716

Hoover, K. S. (2021) Children in nature: exploring the relationship between childhood outdoor experience and environmental stewardship. *Environmental Education Research*, *27*(6), 894-910. DOI: https://www.tandfonline.com/doi/full/10.1080/13504622.2020.1856790

Kaczynski, A. T., Stanis, S. A. W., & Besenyi, G. M. (2012). Development and testing of a community stakeholder park audit tool. *American Journal of Preventive Medicine*, *42*(3), 242-249. DOI: 10.1016/j.amepre.2011.10.018

Kluge, H., Forman, R., Muscat, N. A., Berdzuli, N., & Mossialos, E. (2023). Environmental sustainability of health systems: time to act. *The Lancet*, *401*(10388), 1552-1554. DOI: 10.1016/S0140-6736(23)00730-4

Kondo, M. C., Fluehr, J. M., McKeon, T., & Branas, C. C. (2018). Urban green space and its impact on human health. *International Journal of Environmental Research and Public Health*, *15*(3), 445. DOI: 10.3390/ijerph15030445

Kondo, M. C., McIntire, R. K., Bilal, U., & Schinasi, L. H. (2022). Reduction in socioeconomic inequalities in self-reported mental health conditions with increasing greenspace exposure. *Health and Place*, *78*, 102908. DOI: 10.1016/j.healthplace.2022.102908

Kreslake, J. M., Sarfaty, M., Roser-Renouf, C., Leiserowitz, A. A., & Maibach, E. W. (2018). The critical roles of health professionals in climate change prevention and preparedness. *American Journal of Public Health*, *108*(S2), S68-S69. Doi: 10.2105/AJPH.2017.304044

Levy, C. R., Phillips, L. M., Murray, C. J., Tallon, L. A., & Caron, R. M. (2022). Addressing gaps in public health education to advance environmental justice: time for action. *American Journal of Public Health*, *112*(1), 69-74. https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2021.306560?casa_token=bKLPyXw3e0kAAAAA%3AlJPR7F0ajmaqKrptm1OBBajY-Dxcd6MrJMAirKLldWVmNiZ5UH3ig7ji3mBiXDPtxq3X569gmXaQ

Lombardi, J. (2023). At a crossroads. National Association for the Education of Young Children, Resources. Retrieved July 7, 2023, from https://www.naeyc.org/resources/blog/at-a-crossroads

Louv, R. (2008). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill: Algonquin Books.

McCormick, R. (2017). Does access to green space impact the mental well-being of children: A systematic review. *Journal of Pediatric Nursing*, *37*, 3-7. DOI: 10.1016/j.pedn.2017.08.027

Merritt, E., Hale, A., & Archambault, L. (2018). Changes in pre-service teachers' values, sense of agency, motivation and consumption practices: A case study of an education for sustainability course. *Sustainability*, *11*(1), 155. https://doi.org/10.3390/su11010155

Moore, R. C., & Wong, H. H. (1997). *Natural learning- creating environments for rediscovering nature's way of teaching*. Berkeley, CA: MIG Communications.

Moran, M. R., Bilal, U., Dronova, I., Ju, Y., Gouveia, N., Caiaffa, W. T., de Lima Friche, A.A., Moore, K., Miranda, J. J., & Rodríguez, D. A. (2021). The equigenic effect of greenness on the association between education with life expectancy and mortality in 28 large Latin American cities. *Health & Place*, *72*, 102703. DOI: 10.1016/j.healthplace.2021.102703

Nousheen, A., Zai, S. A. Y., Waseem, M., & Khan, S. A. (2020). Education for sustainable development (ESD): Effects of sustainability education on pre-service teachers' attitude towards sustainable development (SD). *Journal of Cleaner Production*, *250*. https://doi.org/10.1016/j.jclepro.2019.119537

Orr, D. (2004). *Earth in mind- on education, environment, and the human prospect*. Washington, D.C.: Island Press.

Parr, A., Binagwaho, A., Stirling, A., Davies, A., Mbow, C., Hessen, D.O., Bonciani Nader, H., Salmi, J., Brown Burkins, M., Ramakrishna, S., Serrano, S., Schmelkes, S., Shijun, T., & McCowan, T. (2022). *Knowledge-driven actions: Transforming higher education for global sustainability*. Paris: UNESCO. https://doi.org/10.54675/YBTV1653

Reid, A. (2019). Climate change education and research: Possibilities and potentials versus problems and perils?. *Environmental Education Research*, *25*(6), 767-790. DOI: 10.1080/13504622.2019.1664075

Resnick, B., Leider, J. P., & Riegelman, R. (2018). The landscape of US undergraduate public health education. *Public Health Reports*, *133*(5), 619-628. DOI: 10.1177/0033354918784911

Requia, W.J., Saenger, C.C., Cicerelli, R.E, Monteiro de Abreu, L., Cruvinel, V.R.N. (2022). Greenness around Brazilian schools may improve students' math performance but not science performance *Urban Forestry & Urban Greening, 18*, 127768. https://doi.org/10.1016/j.ufug.2022.127768

Rosa, C.D., Profice, C.C., & Collado, S. (2018). Nature experiences and adults' self-reported pro-environmental behaviors: The role of connectedness to nature and childhood nature experiences. *Frontiers in Psychology*, *9*, 1055–1055. https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2018.01055/full

Russo, A., & Andreucci, M. B. (2023). Raising healthy children: Promoting the multiple benefits of green open spaces through biophilic design. *Sustainability*, *15*(3), 1982. https://doi.org/10.3390/su15031982

Sugar, S. (2021). The necessity of urban green space for children's optimal development. New York: UNICEF. https://www.unicef.org/media/102391/file/Necessity%20of%20Urban%20-Green%20Space%20for%20Children%E2%80%99s%20Optimal%20Development.pdf

Vanaken, G-J, & Danckaerts, M. (2018). Impact of green space exposure on children's and adolescents' mental health: A systematic review. *International Journal of Environmental Research and Public Health*, *15*(2), 2668. DOI: 10.3390/ijerph15122668

Vidal, D. G. & Seixas, E. C. (2022). Children's green infrastructure: Children and their rights to nature and the city. *Frontiers in Sociology*, *7*, 804535. DOI: 10.3389/fsoc.2022.804535

Warren, A.E., Archambault, L.M., Foley, R.W. (2014). Sustainability education framework for teachers: Developing sustainability literacy through futures, values, systems, and strategic thinking. *Journal of Sustainability Education*, *6*. http://www.jsedimensions.org/wordpress/wp-content/uploads/2015/01/Warren-et-al.-JSE-May-2014-With-Hyperlinks-Rider-corrected.pdf

Wells, N. M., & Evans, G. W. (2003). Nearby Nature: A Buffer of Life Stress among Rural Children. *Environment and Behavior*, *35*(3), 311–330. https://doi.org/10.1177/0013916503035003001

Wendelboe-Nelson, C., Kelly, S., Kennedy, M., & Cherrie, J. W. (2019). A scoping review mapping research on green space and associated mental health benefits. *International Journal of Environmental Research and Public Health*, *16*(12), 2081. Doi: 10.3390/ijerph16122081

Will, M. (Dec. 29, 2022). A new program will train teachers to teach climate change, without the 'doom and gloom'. *Education Week*. Retrieved July 7, 2023, from https://www.edweek.org/teaching-learning/a-new-program-will-train-teachers-to-teach-climate-change-without-the-doom-and-gloom/2022/12

Thumbnail photos of the authors

Katie Bucher

Russell McIntire