The Journal of Applied Instructional Design

December 2021

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About the Journal

During the past 50 years, journals in the field of instructional design have been responsive to the changing needs of both scholars and to a lesser degree, the practitioner. We have seen an evolution of AVCR to ECTJ, the emergence of JID, and finally the merging of ECTJ and JID to form ETR&D. ETR&D is a widely recognized, scholarly journal in our field that maintains rigorous standards for publications.

During the past 50 years, we have also witnessed a change in the field due in part to the success of instructional design in business and other nonschool environments. The number of instructional designers working outside the university has dramatically increased. Of particular importance is the rise in the number of instructional designers with doctorates who consider themselves practitioners, but not necessarily scholars. This growing group of designers might be best described as reflective practitioners who can make a significant contribution to the knowledge of our field.

This growth and success in the application of instructional design has also changed the field. From the early days of the field until the mid-1980's, the theory and practice of instructional design was almost exclusively influenced by the academic community. With the growth of instructional designers, the theory and practice of the field is now defined by both academics and practitioners. There is a need for greater communication between the scholars and the practitioners in a scholarly journal that will support innovation and growth of our knowledge base.

Goals

The purpose of this journal is to bridge the gap between theory and practice by providing reflective practitioners a means for publishing articles related to the field. The journal establishes and maintains a scholarly standard with the appropriate rigor for articles based on design and development projects. Articles include evaluation reports (summative and formative), lessons learned, design and development approaches, as well as applied research. The articles are based on design and development projects as opposed to pure research projects and focus on lessons learned and how to improve the instructional design process. Rigor is established through articles grounded in research and theory.

A secondary goal of this journal is to encourage and nurture the development of the reflective practitioner in the field of instructional design. This journal encourages the practitioner as well as collaborations between academics and practitioners as a means of disseminating and developing new ideas in instructional design. The resulting articles inform both the study and practice of instructional design.

Philosophy

This journal will provide a peer-reviewed format for the publication of scholarly articles in the field of applied instructional design. The journal recognizes the role of the practitioner in the work environment and realizes that outside constraints may limit the data collection and analysis process in applied settings. The limitations of real-world instructional design of the practitioner can still provide valuable knowledge for the field.

Sponsoring Organization

JAID is a publication of the [Association for Educational Communications and Technology](#) (AECT).

JAID is an online open-access journal and is offered without cost to users.

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About AECT

The [Association for Educational Communications and Technology](#) (AECT) is a professional association of instructional designers, educators and professionals who provide leadership and advise policy makers in order to sustain a continuous effort to enrich teaching and learning. Seizing opportunities to raise awareness and leverage technology, our members may be found around the world in colleges and universities, in the Armed Forces and industry, in museums, libraries, and hospitals, and in the many places where educational change is underway. Our research and scholarly activity contribute to the knowledge base in the field of Learning. We are on the cutting edge of new developments and innovations in research and application.

AECT is the premier organization for those actively involved in the design of instruction and a systematic approach to learning. We provide an international forum for the exchange and dissemination of ideas for our members and for target audiences. We are the national and international voice for improvement of instruction and the most recognized association of information concerning a wide range of instructional and educational technology. We have 24 state and six International Affiliates all passionate about finding better ways to help people learn.

Since 1923, AECT has been the professional home for this field of interest and has continuously maintained a central position in the field, promoting high standards, in both scholarship and practice with nine Divisions and a Graduate Student Assembly that represent the breadth and depth of the field. Other journals sponsored by AECT include *Educational Technology Research and Development* and *TechTrends*.

The Journal of Applied Instructional Design (JAID) is a refereed online journal designed for the publication of scholarly articles in the field of applied Instructional Design. The purpose of JAID is to provide the reflective ID scholar-practitioners and researchers a means for publishing articles on the nature and practice of ID that will support the innovation and growth of our knowledge base. The journal is for practitioners, instructors, students, and researchers of instructional design.

Call for Submissions

JAID is for reflective scholar-practitioners, who through documentation of their practice in ID, make significant contributions to the knowledge of our field. Authors are invited to submit articles documenting new or revised approaches to ID; the processes of ID including in-depth documentation of analysis, design, and development, implementation and evaluation; design-based research; as well as applied research. Articles must be based on instructional design projects as opposed to pure research projects and focus on documented processes, lessons learned, and how to improve the overall process of ID. Articles must be grounded in research and theory connecting the intellectual foundations of the ID field and how these foundations shape its practice.

The journal will establish and maintain a scholarly standard with the appropriate rigor for articles based on design and development projects. A secondary goal of this journal is to encourage and nurture the development of the reflective practitioner in the field of ID. This journal encourages the practitioner as well as collaborations between academics and practitioners as a means of disseminating and developing new ideas in ID. The resulting articles should inform both the study and practice of ID.

Submit an Article

Article Types

JAID currently accepts submissions of three article types.

Instructional Design Practice

This is an applied journal serving a practicing community. Our focus is on what practitioners are doing in authentic contexts and their observed results. These articles cover topics of broad concern to instructional design practitioners. The articles should represent issues of practical importance to working designers.

Research Studies on Applied Instructional Design

JAID is interested in publishing empirical studies exploring the application of instructional design principles in applied settings. Quantitative and qualitative studies are welcome.

Instructional Design/Performance Design Position Papers

JAID also accepts position papers that attempt to bridge theory and practice. Examples may include conceptual frameworks and new ideas facing the instructional design community. The paper must also provide enough information to allow the replication of the innovation or continuation of the research in other settings. Position papers must be based in the context of a theoretical framework. Efficacy data is strongly preferred, but not always required, contingent upon the potential generalizability or value of the innovation.

Submission Guidelines

The journal will focus on in-depth applications of the ID process and publish a variety of articles including case studies of the ID process; application articles that go beyond a mere how-to approach that provide implementation insights, guidance and evaluation of a process; evaluation articles that focus on the viability of a product or process; applied research resulting from evaluation of materials, studies of project implementation, articles on ways to improve the ID process from the perspective of the practitioner, and short essays that provide a scholarly debate of relevant issues related to the application of ID and relevant book reviews. When applicable, articles should include supplementary materials including examples of ID products, evaluation instruments, media files, and design artifacts.

The articles in the journal will be from the perspective of the scholar-practitioner rather than from the researcher. However, the manuscripts must demonstrate scholarly rigor appropriate to applied manuscripts.

Articles, including tables or figures, must follow APA 7th edition formatting and be submitted in a word or doc format using at least 12-point New Times Roman font. Each article must have an abstract (75-100 words) and a list of keywords. While there is some flexibility in the length of an article, 4,000 to 5,000 words is a best-guess estimate. If in doubt, contact the editor prior to submitting the article. Identifying information must only be located on the cover page including contact information for the first author.

You may contact the editors via email, if you have further questions.

Contact the Editor

Preface to the Special Issue

Attending to Issues of Social Justice through Learning Design

Theodore J. Kopcha, Tutaleni Asino, Lisa A. Giacumo, & Katherine Walters

Introduction

Across the globe, recent events have brought the reality and consequences of inequality and oppression to the forefront of our awareness. Economic and racial disparities in healthcare exposed by COVID-19 intersect with outrage over neglect of basic human rights, creating an urgent and pressing need to address the systemic nature of such issues. As the educational community moves into conversation and action around these systemic inequalities, many are asking, "What can I do?"

At first glance, the field of learning, design, and technology seems an unlikely context for taking up such issues. Scholars in our field have a rich history of studying the ways that technology improves learning and performance in various educational contexts, as evidenced in a number of recent meta-analyses on various technologies (see Hassler et al., 2016; Merchant et al., 2014; Zheng et al., 2016). While this perspective is an undeniable part of our field's identity, it is also a narrow one. It ignores a growing interest and focus on learning design and the role that educational technology can play in addressing ongoing and longstanding issues of systemic injustice and oppression (e.g., Bradshaw, 2018; Dickson-Deane et al., 2018; Sulecio de Alvarez et al., 2018).

The reality is that our field is not merely a collection of tech-savvy scholars. We are a diverse, interdisciplinary group of educators who engage in learning design in complex and creative ways. Broadly speaking, our work explores how the purposeful analysis and design of learning environments can address persistent problems in a variety of educational and organizational settings (e.g., Henrick et al., 2015; McKenney & Reeves, 2017; Richey et al., 2002). We care deeply about the learner and the learner's experience and how to best support that experience in a given context (Schmidt et al., 2020; Stefaniak, 2020). To achieve this goal, we blend theory and technology in novel ways to develop, implement, and evaluate the efficacy of both instructional and non-instructional interventions. For many of us, this entails working in and pushing back against systems that promote or perpetuate injustice and inequality.

With this context in mind, this special issue was created to bring focus to the ways our field is attending to issues of social justice through learning design. The articles selected for this special issue explore and offer insight into the following questions:

> How can learning design be applied and leveraged to promote social, political, and economic change? And what role can we, as designers, play in that work?

Article Selection

For this special issue, we welcomed contributions from K-12, higher education, and other organizational or workplace contexts (e.g., nonprofit organizations, government, corporate) that focused on how learning design can serve as a tool for pushing back against and/or changing systems that often promote or perpetuate injustice and inequality. The final result is a collection of articles about the practical ways in which designers are taking up social justice in their own work, including the following:

- Culturally situated and cross-cultural approaches to instructional design and research
- Improving performance in the context of workplace inequity
- Participatory models of learning
- Long-term projects that address disparity issues regarding access to technologies and resources (e.g., digital and pedagogical divide)
- Applications of critical theory in learning design
- Ethical and responsible (i.e., humanizing) concerns regarding the collection, analysis, and presentation of data and findings

The contributions we selected paid particular attention to specific social and political issues, such as inequities in access and/or instruction based on race, culture, ethnicity, gender identity, etc.; power dynamics that create or sustain an environment of unequal opportunities or expectations; disparities in identifying/designing opportunities for learning based on race, culture, or dis/ability. Because concepts like justice, equality, and change are complex and multifaceted, we sought contributions that articulated the relationship among the factors involved rather than studies that isolate any single factor on its own. In doing so, our hope was to promote the unique and innovative nature of learning design and organizational systems changes in addressing what have become long-standing issues in learning, education, organizational performance improvement, and change.

The result was a collection of 14 articles that are both conceptual and practical in nature. The papers, which are described briefly below, represent ongoing and current efforts to engage in the practice of instructional design while addressing social justice issues in today's learning contexts. It is our hope that these articles will offer other designers insight into the ways that issues such as racial inequity, inequity in power and access, and economic disparity can be attended to and, if possible, ameliorated through the act of learning design.

Overview of Articles

The 14 articles that make up this special issue are organized into four distinct themes: Perspectives on ID Practice, Social Justice Issues in Higher Education, Social Justice Strategies for K-12 Teachers, and Issues of Social Justice in STEM Education. The themes and papers within each theme are described below.

Perspectives on ID Practice

This first theme explores a variety of perspectives on ID practice that center on social justice theories to support learning and performance improvement. In the first paper, "The Design Models We Have Are Not the Design Models We Need," Stephanie L. Moore describes how the application of ethics as a design lens offers us welcomed insights into existing design models and new opportunities for design practices. Using an ethics framework, the author critiques our current models, describing gaps related to social, economic, political, accessibility, inclusion, and diversity. Finally, the author argues that adjusting existing models to solve such problems might be difficult, suggesting that our field may need to add new models or draw emphasis to different approaches like problem framing.

In the second paper, "Designing for Liberation: A Case Study in Antiracism Instructional Design," Ryan Ikeda, Kai Nham, Laura Armstrong, Victoria Robinson, Fiona Diec, Nicole Kim, Douglas Parada, Diana Sanchez, and Kelly Zhen suggest that instructional designers can support dismantling white supremacy logic and focus on the liberation of BIPOC students when provided with an antiracist framework, principles, and model. They describe how this can be done

through a case study approach. The results center on a fellows program designed to address inequitable access to innovative technology intended to amplify stories of individuals who are minoritized by dominant cultural frameworks.

In the third paper, "Promoting Organizational Justice In Cross-cultural Data Collection, Analysis, And Interpretation: Towards An Emerging Conceptual Model," Lisa Giacumo, Madeleine Yount, and D'Jeane Peters merge organizational justice theory with existing cross-cultural data collection, analysis, and interpretations guidelines for project work. Their result delivers a new model to guide researchers, IDs, and HPI practitioners in their work to facilitate decision-making that is more inclusive, equitable, and socially just.

In the last paper in this theme, "Reconsidering Dale's Cone: Towards the Development of a 21st Century 'Cone of Experience' to Address Social Justice Issues," William Sugar and Delaney Collyer describe a framework of instructional technologies that may be leveraged to impact social justice. They then combine this framework and Molenda and Subramony's (2021) communication configurations to propose an array of instructional activities related to social justice.

Social Justice in Higher Education

The second theme focuses on the ways that designers have addressed a variety of social justice issues in the context of higher education. In the first paper in this theme, "Equity Unbound as Critical Intercultural Praxis," Mia Zamora, Maha Bali, Parisa Mehran, and Catherine Cronin trace the emergence of Equity Unbound, an online, participatory community of educators conceptualized and initiated in 2018. The manuscript shares the design and collaborative path of educators from different countries and higher education systems. The social justice work done through Equity Unbound resulted in a supportive community where educators can be vulnerable as a way to become better teachers and human beings, yet cognizant of the limitations and constraints of aspiring for an equitable world.

In "Realizing Equity & Inclusion Goals in the Design of MOOCs," Chelsea Chandler, Rebecca Quintana, Yuanru Tan, and Jacob Aguinaga explore the connection between diversity, equity, and inclusion (DEI) goals of faculty and their enactment in a resulting open online course. The findings suggest that there are differences between DEI goal development in a single MOOC as well as a MOOC series. However, to achieve social justice, the authors argue that there is a need for learning designers and faculty to work collaboratively on the planning and implementation of DEI goals for each course.

In the third article, "Designing For Every Student: Practical Advice For Instructional Designers On Applying Social Justice In Learning Design," Eliana Elkhoury and Fouzia Usman argue for using a social justice lens when designing curricula for the classroom. Rather than present a prescriptive approach to addressing social justice, the authors provide broad recommendations for applying a social justice lens with a particular focus on inclusivity, communication, content, flexibility, and feedback-seeking. The recommendations offer other instructional designers an approach for developing curricula and creating an inclusive learning environment that serves the needs of all students.

In the last article in this theme, "Designing a Virtual Learning Environment for Critical Media Literacy Education," Ali Söken and Kysa Nygreen reflect on how they redesigned a large undergraduate course on critical media literacy. The authors describe how they used Universal Design for Learning (UDL) to inform design choices centering on equity, accessibility, and social justice. Their findings detail how the course redesign increased flexibility and accessibility while putting student learning goals at the center of the design. The authors advocate for design approaches that consider the impact of social contexts and social inequalities in an effort to maximize accessibility and social justice.

Social Justice Strategies for K-12 Teachers

The next theme explores the impact of professional development programs focused on developing social justice strategies for teaching and learning in K-12 contexts. In the first paper in this theme, "Preparing Educators for Culturally Responsive Teaching Through Technical Cultural Representations," Kevin Oliver, Angela Wiseman, and Cori Greer-Banks describe a professional development program that incorporated an immersive study abroad experience to prepare in-service teachers for culturally responsive teaching from a global perspective. Central to the PD experience was the

opportunity for teachers to investigate and create digital representations of cultural themes identified during their study abroad. The authors report the results of an impact study on teacher participants' changing classroom practices after the PD and end with design recommendations for PD programs that support the development of CRT.

In the next paper, "Learning in Diverse Educational Contexts: Bringing Social Justice when Designing Culturally Rich Learning Experiences in Brazil," Vivian Martins, Ana-Paula Correia, and Edméa Santos explore the ways a professional development course can culturally situate educational experiences. Rooted in the critical pedagogy of Paulo Freire, the authors used the method of research training in cyberculture to collect and assess participants' narratives about their culturally rich learning experiences. These experiences supported teacher participants in identifying the cultural resources of the Baixada Fluminense in Brazil, and, by doing so, pushed back against a common narrative that this poor urban area does not have or produce a distinct culture of its own.

In the next paper, "Humanities Education in the U.S. Rural South: Design, Development, and Practice," Katherine Walters, Theodore (TJ) Kopcha, and Christopher Lawton examine how professional development can play a role in preparing teachers to take up issues of racial and economic inequality in the rural U.S. South. Using design-based implementation research (DBIR) as an overarching method, the authors present empirical evidence to establish learning strategies that supported teachers in fostering a unique blend of a humanities education with project-based learning.

In the last paper in this section, "STEM Teachers' Designs for Learning: Addressing the Social and Political Climate During COVID-19," Tiffany Roman, Belinda Edwards, Michael Dias, and Laurie Brantley-Dias report on the findings of a case study of secondary STEM teachers who participated in professional development on trauma-informed pedagogies and social justice education. Through analysis of interviews and teacher-produced lessons, the authors examine how these teachers designed instruction that supported students in applying STEM knowledge to social justice issues. The authors also identify the challenges faced by teachers engaging with social justice issues in the classroom and the types of continued support required to help meet these challenges.

Issues of Social Justice in STEM Education

The final two papers of the special issue focus on issues of social justice in STEM education. In the first, Diane Codding and Hui Yang examine how university-library partnerships can provide access to computer science instruction through culturally responsive informal learning design. Their paper, "Computing for Communities: Designing Culturally Responsive Informal Learning Environments for Broadening Participation in Computing," details a partnership between undergraduates and public library staff members in which they introduced computer science concepts and Scratch programming to underrepresented youth. Their paper addresses longstanding issues around the underrepresentation of female and racially minoritized youth in STEM disciplines.

In the final paper in the special issue, "With Our Community, for Our Community: Expanding Possibilities for Engaging in STEM," Justine Nation, Francesca Sen, Joi Duncan, David Sañosa, and Richard Durán examine a Community STEM project where Latinx teens addressed the issue of local noise pollution. Using an ethnographic perspective, the authors share the results of a curriculum design that leverages the expertise of STEM-underrepresented youth. Their results offer insight into the ways that afterschool programs can be used to promote STEM skills and foster greater interest in a career in STEM.

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The Design Models We Have Are Not the Design Models We Need

Stephanie L. Moore

Ethics   Instructional Design Models

Whitbeck (1996) presents a design-anchored approach to ethics that provides a way to think about the intersection of instructional design and social justice. While ethics are typically treated as deciding between what is "right" or "wrong," Whitbeck (1996) explains this is a simplistic view, as ethics are about confronting complex moral problems that require designers to devise responses (design). When critiqued through the lens of accessibility and equity and racial and economic inequalities, areas where present design models fall short become apparent. Ethics as design affords a way to see design models anew and reconsider design practices.

Introduction

The Cooper-Hewitt, Smithsonian National Design Museum held an exhibit called "Why Design Now?" (2010) that showcased solutions and products from various design disciplines addressing major social challenges, demonstrating the role design plays in making the world a better place. Examples included very low-cost adjustable eyeglasses, high-density affordable housing that was also green and aesthetic, solar solutions for electric power in remote locations, furniture made from entirely recyclable material that was also comfortable and aesthetic, and many other solutions and artifacts. In each case, the designer started with a social gap addressed throughout the design and development or manufacturing process, demonstrating how the abstract ideas of "doing good" or "adding value" can be translated into design objectives and realizable results. In the hands of designers, these abstractions became design constraints and specifications—practical visions for improved products and spaces. When ethics are framed in context of design, they become a thing to do and produce, baked into the fabric of designers' professional practices.

The standard approach to professional ethics is developing a code more often used as an external judgment of an individual's behavior rather than as considerations or specifications informing design and decision making. This default frame can result in binary reasoning, aiming to distinguish ethical from unethical. or rightness from wrongness. Many professionals do not see a connection to practice beyond avoiding judgments, which translates into a distancing

between ethics and practice, even if instructional designers recognize that many of the design problems worked on are either ethical in nature or include ethical issues—such as equity and inclusion, social justice, and data rights and privacy. While the Code of Professional Ethics from the Association of Educational Communications and Technology (2020) includes statements such as protecting "individual rights of access to materials" (Section 3.1.2), making "reasonable efforts to protect individuals from conditions harmful to health and safety" (Section 3.1.6), and "seek to avoid content that reinforces or promotes gender, ethnic, racial, or religious stereotypes" (Section 3.1.8), none of these standards appear in instructional design models or processes in the field. The "Why Design Now?" exhibit and practices in other design disciplines to reconceptualize ethics through design offer a different way to think about ethics, focusing on solving social problems and dismantling social inequities rather than as a code of conduct.

The absence of ethical considerations in design models present a significant limitation in both the models and mindset as a field resulting in disservices and injustices to learners and educational, organizational, and social systems. An examination of the models summarized in Branch & Dousay (2015) quickly shows no model in the field depicts how values or beliefs influence the design process or where and how ethical considerations arise during design, development, implementation, or evaluation. While injustices may be quite unintentional, they often happen because we do not plan or design for it to be any different. William McDonough (2006), an architect and sustainability designer, explains it this way in a recorded talk:

> It's no longer acceptable for us to say this isn't part of our plan . . . because it's part of our de facto plan. It's the thing that's happening because we have no other plan. Then we realize as a culture that we have become strategically tragic."

He continues by exploring how design "is the first signal of human intention" (McDonough, 2006) and is considered inherently optimistic, but often the designs of systems and products do not reflect a sense of optimism. The field of instructional design is at this point in confronting what intent is signaled in our designs, in part through this special issue, and what role instructional design and learning technologies play in either reinforcing and perpetuating or in mitigating injustices and inequalities. Do instructional design practices and designs reflect an optimistic vision for human learning, development, and flourishing, or is there an operant *de facto* plan where these injustices continue to happen because designs do not envision any other way?

The field has started to see re-examination of research in our discipline such as Reeves and Lin's (2020) argument that the research we have is not the research we need. They note how educational technology research "does not have a distinguished record in dealing with local educational problems, much less global ones" (p. 1998) and that research questions should shift from "what works" to "what is the problem, how can we solve it, and what new knowledge can be derived from the solution?" (p. 1998). The author argues not only do research methods require re-examination but design models as well, or perhaps even more fundamentally design practices and philosophies. At present, instructional design models—such as Dick, Carey, and Carey (2003); Morrison, Ross, Kalman, and Kemp (2013); and others covered in the Branch & Dousay (2015) survey—do not prompt problem solving or engagement in complex, seemingly intractable broader social problems. Ironically, these are the very sorts of problems design is particularly well-suited to in its ability to contend with unclear or conflicting desired ends, divergent needs, and diverse stakeholders and inputs. If instructional design models and processes do not reflect a shift to helping to solve complex social problems, then the inequities and injustices happening as a result of educational technology remain the *de facto* plan. Additionally, if design efforts are constrained or exclude broader social issues, it limits the potential for research efforts to change accordingly. A complementary realignment is necessary.

Framing the Problem

In the Smithsonian exhibit, each designer or developer made a series of decisions on whether or not to include justice and equity in their designs. Those decisions could result in, for example, a pair of glasses that works but is not affordable, thus creating barriers to access, or a pair of glasses that works and is also as affordable as possible, thereby lowering barriers to access. The main difference lies in how the designer framed the problem. Similarly,

designers in the field of instructional design make decisions every day that impact a range of outcomes including, but not limited to, learning outcomes. Interviewing instructional designers, Lin (2007) identified several common ethical concerns in practice: copyright, learner privacy and accessibility, diversity, conflicts of interest, and professionalism. How designers frame the problems they are working on determines the nature of the solutions generated (Svihla, 2020), and thus directly impacts what problems designers address—or not. In the instructional design field, the model(s) designers learn and use in practice have significant influence on how the problems are framed, but do these models do justice to the complex problems designers work on in the real world?

Social justice, equity, and accessibility issues arising during the pandemic highlighted how problems instructional designers and educational technologists work on are not limited to learning outcomes but include ethical considerations that should be part of the problem framing to inform the solutions we devise. For example, during the pandemic, over-reliance on synchronous online learning as *the* solution created a conflict between organizational and curricular objectives like instructional continuity and learners' and families' needs and realities where internet access was difficult or impossible. A large number of students do not have internet access at home (Brooks & Grajek, 2020), and many students do not have home environments conducive to learning (online or otherwise) or even necessarily a place to go (Goldrick-Rab et al., 2019). For primary and secondary education, many parents and caretakers were unable to work from home, leaving them with untenable situations of children learning online at home while they had to work outside of the home. These situations disproportionally impacted families of color and lower-income families. Black and Hispanic workers in particular were less likely to be able to work remotely (Gould & Shierholz, 2020). Most workers in the top quartile of income indicated they could work remotely, while only 9.2% of employees in the bottom quartile reported they could work remotely (Gould & Shierholz, 2020), translating into stress and concern about internet and mobile access issues (Vogels et al., 2020).

While schools and universities emphasized instructional continuity, students' and families' lives were upended as millions lost their jobs (Pickert, 2020) and dealt with serious health issues or deaths of loved ones. As schools and universities were going entirely online, frustrations erupted as many were left out. The *New York Times* front page from March 27, 2020 tells the story in a single snapshot with headlines of "Job Losses Soar" (Casselman et al., 2020) and "Online Class with No Way to Get There" (Stewart, 2020). It was easy to tell students to go home and connect to the Internet, but the reality behind that dictate put students on more unequal footing, exacerbating issues around diversity and equity of access.

Complicating matters, many schools and universities purchased proctoring software, which introduced additional ethical issues around student privacy, discrimination, and data rights (Flaherty, 2020; Kimmons & Veletsianos, 2021). Higher educational technology decisions prioritized enrollments and revenue as chief continuity considerations. College decisions to reopen in Fall 2020 were largely unrelated to COVID-19 infection and mortality rates; rather, politics and fiscal concerns about impact on enrollments played a larger role in decisions on reopening (Felson & Adamczyk, 2021).

As tempting as it may be to try to distance the instructional design field from these decisions and their impacts, instead, designers should carefully consider how to be part of solving the problems. Frankel (1989) observed "society's granting of power and privilege to the professions is premised on their willingness and ability to contribute to social well-being and to conduct their affairs in a manner consistent with broader social values" (p. 110). The post-COVID-19 world for the instructional design profession is a significant point in time when society's granting of power and privilege may be quite tenuous, as educational technology implementations and policies were largely executed to serve bottom lines rather than learning or social needs.

Learning Objectives Are Not the Only Objectives

Instructional design models do not frame the problems to include social, economic, and political realities. For example, models regularly frame conversations about technology selection in terms of learning affordances, but technology selection is just as if not more constrained by the socio-cultural context as well. While design models prompt designers to identify entry-level characteristics of learners, describe the context for knowledge transfer, conduct task analyses,

etc., the models remain firmly fixed on what Kaufman (2000) categorizes as "micro" level outcomes to the exclusion of broader social issues. In one effort to address these shortcomings, Hodges et al. (2021) used the general ADDIE model and the Morrison et al. (2013) model, but in order to address ethical problems that crop up in practice such as lack of internet access, they had to append a lot of additional considerations in the needs analysis and learner analysis prompts. They added entirely new sections on contextual analysis and infrastructure analysis as well as integrated accessibility and flexibility considerations throughout design and development stages (Hodges et al., 2021)—in short, an overhaul. By examining current models through two aspects of social justice—accessibility and inclusion and racial and economic inequalities—the field may begin to identify blind spots, examine how those blind spots impact practice, and consider how to reframe the problems designers work on in practice.

Accessibility and Inclusion Issues

One regular ethical consideration often arising in practice is accessibility. By no means is this a new topic in practice, with columns and legal discussions dating back into the 1990s in some instructional design and educational technology journals. However, Rieber and Estes (2017) documented how accessibility is largely ignored in the Dick, Carey, and Carey model and the literature of the field. The Dick et al. (2009) model makes passing mention of compliance with ADA with a single paragraph mentioning accessibility and suggesting instructional designers simply "comply with requirements" (p.197). Out of 690 articles in the research journal *Educational Technology Research & Development*, only six related to people with disabilities. In the Reiser and Dempsey (2012) trends and issues book, only one chapter mentioned accessibility. Although a narrow analysis, this is consistent with other findings from Moore and Ellsworth (2014) who found similar patterns across major journals in the fields and across various topics that can be classified as "ethics." More recently, Kimmons (2020) similarly notes the top 20 trends in research in our field do not include any focus on social problems anywhere in the list.

A cursory review of other major design models suggests the gap in accessibility noted by Rieber and Estes (2017) persists across most instructional design models. For example, in the Morrison et al. (2013) model, there are only five sentences devoted to accessibility, and these sentences present a troubling perspective:

> Although some persons with physical disabilities can participate in regular classes, others cannot . . . A careful analysis of individual abilities should include observation, interviews, and testing. Many learners with disabilities require special training and individual attention. Therefore, an instructional program may require extensive modification to serve such learners appropriately. Specialists [. . .] should be a part of an instructional planning team (p. 57-58).

What is conveyed here is a sort of "not our job" approach to accessibility. In other models included in the Branch and Dousay (2015) survey text, no mention is made about accessibility, and the models do not prompt a practitioner or decision maker to evaluate social issues or needs like access to internet or social and cultural characteristics of learners that should inform technology selection and implementation. The model developed by Dabbagh and Bannon-Ritland (2005) comes closest, with some passing mentions of accessibility considerations and copyright, although most of the accessibility mentions are focused on remote access, not accessibility for users with disabilities. The impression conveyed by a survey of instructional design models is that the field considers accessibility to be a problem someone else solves, despite other design-oriented disciplines adopting design practices and philosophies that integrate accessibility considerations.

Universal design emerged out of a collective effort across various disciplines to develop design standards for making buildings and physical infrastructure more broadly accessible to as many users as possible (Mace et al., 1991; Moore, 2007; Ostroff, 2001; Welch, 1995). In environmental engineering and architecture, the design philosophy of "barrier-free design" emerged in the 1950s, placing an emphasis on removing obstacles for people with physical disabilities. Over time, this design philosophy evolved into "design-for-all" and "lifespan design" with an emphasis on designing products, environments, and communications to be usable by all people to the greatest extent possible. It expanded into fields such as industrial design, and in 1987 the World Design Congress passed a resolution stating designers should factor disability and aging into designs. That year, US architect Ron Mace coined the term "universal design," and these design

disciplines continued to evolve their practices to place more emphasis on better understanding users, user diversity, and how to design flexible products and environments that assume user variability by default. More recently, organizations like the Center for Applied Special Technology, or CAST, adapted the principles of universal design to learning contexts, adding some principles for design that were specific to the design of learning environments and materials.

However, instructional design models and principles remain largely untouched by these and other social developments. Consider the following design principles articulated by the Adaptive Environments Center (now renamed the Institute for Human Centered Design):

- Varying ability is not a special condition of the few but a common characteristic of being human and we change physically and intellectually throughout our lives;
- If a design works well for people with disabilities, it works better for everyone;
- At any point in our lives, personal self-esteem, identity and well-being are deeply affected by our ability to function in our physical surroundings with a sense of comfort, independence and control (Weisman, 1999);
- Usability and aesthetics are mutually compatible.

Contrast these design principles with the excerpts from Dick et al. (2009) and Morrison et al. (2013), which places more emphasis on distinction, exclusion, and separation than it does on inclusion and inherent, natural diversity among learners. Accessibility and inclusion are widespread blind spots in instructional design models and practices, and at a minimum the field can address this through reconsidering these models and how instructional design is taught and practiced.

Racial and Economic Inequalities

In addition to blind spots around accessibility and inclusion, existing instructional design models were born of a time when the learners studied were exclusive and segregated populations. Bradshaw (2018) provides a window into the paradigms and assumptions infusing existing instructional design models. She highlights how, for example, Gagné's work was developed in a specific context, the military, at a time when the military was still racially segregated—and also specifically de-selected for physical disabilities. She further highlights how commonly-taught works by Skinner, Bloom, and Maslow were published in the same timeframe and social context as major historical civil rights events such as the *Brown v. Board of Education* decision from the US Supreme Court on educational desegregation, the murder of Emmett Till, and Rosa Parks' refusal to give up her seat on a public bus.

By implication, the learners who were studied in the published research and envisioned in frameworks and models are white or exclusively white, male, and have a specific set of physical capabilities. When these demographics function as hidden defaults in a framework or model, then design activities such as learner analysis fail to prompt important considerations that stem from assuming inherent human diversity. Assumptions about learners may have changed to an extent in more recent years, but instructional design models and processes have yet to reflect this sort of paradigm shift. As a result, the education and training provided to new practitioners in our field—through introductory instructional design courses which rely on traditional instructional design models and processes—do not prompt social, economic, cultural, and racial considerations. This blind spot influences the options and solutions we devise that would be more effective for diverse learners in varying contexts. Arguably, this is what structural privilege and structural racism, sexism, ableism, and classism looks like in the context of the field's professional practices.

Gray and Boling (2016) note the instructional design and technology field "has not historically focused their view of practice on ethics, instead relying on a more scientistic view of practice that artificially limits the designer's interaction with the surrounding society through the artifacts and experiences they design" (p. 969). One of the effects of more scientistic models and processes is that they create a dehumanizing disconnect in practice by favoring an abstracted and generalized process and scrubbing the reality that a human designer or team of human designers are making decisions situated in a specific social context. According to Gray and Boling (2016), this "leads us to a place where rigor is placed in processes rather than the character of a designer, and the ethically charged outcomes of a design can be avoided or diminished" (p. 995). In and through these conscious and unconscious choices about how designers

represent and frame design, the field collectively fails to address issues of social justice in the products and environments designed and built because social justice has largely been framed out. As the field starts to lay bare this *de facto* design where injustices happen because we do not plan for them to be any different, these status quo processes become no longer acceptable.

Ethics as Design

Caroline Whitbeck (1996), an engineer who studies ethical reasoning in engineering practice and research, advocates for a design-anchored approach she calls "ethics as design." She explores how most ethical problems are very similar to design problems. For example, for both design problems and ethical problems there are rarely uniquely correct solutions. While some responses may be unacceptable, there are likely to be different solutions which are equally acceptable and have different advantages while balancing trade-offs differently. Similar to design, ethics requires synthesis, not purely analysis. Whitbeck (1996) states, "devising a good response requires synthetic reasoning. Ethics has paid more attention to analytic reasoning and the analysis of ethical problems and possible answers to them. Analysis is important but it is not sufficient to devise responses" (p. 2). While ethics are typically treated as deciding between what is "right" or "wrong," Whitbeck (1996) explains this view as a simplistic view because ethics are about confronting complex moral problems that require responses, especially for problems in which no perfect solution without tradeoffs is possible. The need to respond is what makes these problems practical in nature, not philosophical, and what makes them design problems specifically. It is not enough, Whitbeck (1996) argues, to merely evaluate or judge, but "one must *devise* possible courses of action" (emphasis in the original; p.9).

The need to devise courses of action and solutions is where design becomes central to addressing issues of social justice as well as other ethical considerations. "The design process," Whitbeck (1996) argues, "highlights the very aspects of the agent's response to moral problems that philosophy and applied ethics have had difficulty illuminating" (p. 10). Whitbeck (1996) provides a way to think about how to infuse ethics and in particular social justice considerations into instructional design. Through this lens of "ethics as design," instructional designers can begin to see design practices anew and reconsider where and how to weave ethics throughout the design process as well as query the processes and models themselves.

In the instructional design discipline, Svihla (2020) describes problem framing, defining it as a process where the designer needs to "take ownership of and iteratively define what the problem really is, decide what should be included and excluded, and decide how to proceed in solving it" (para. 2). Designers produce different solutions primarily because they have framed the problem differently. Thus, where one designer may focus solely on learning outcomes, another designer may see social justice as a dimension of the problem and endeavor to address it throughout the design, development, and/or decision-making process. For example, Ingraham and Boyd (2020) explore integration of social justice into development of learning simulations by reviewing draft designs for any whitewashing and racial stereotyping and revising virtual characters and representations based on this form of reflective design practice. Glaser et al. (2020) discussed adverse effects of virtual reality for learners with motion sickness and the implications for vulnerable populations along with design and development considerations. Yu et al. (2020) suggested design guidelines for more inclusive online learning in four areas: context, content, facilitation, and assessment. These examples demonstrate how designers framed problems not only as learning, but also as social justice problems, turning ethical considerations into design parameters.

Integration of Ethics into Design

In a content analysis of eight design cases, Gray and Boling (2016) identified some common themes of how and where instructional designers incorporated ethics into the design process. One theme, prioritization of constraints, echoes Whitbeck's (1996) approach as well as emphasis on problem framing. Gray and Boling (2016) note "the constraints that the designers and their teams selected dramatically impact the scope of potential outcomes of the design process" (p. 989). Design activities that involve framing the problem and identifying and prioritizing design constraints and

specifications are a key leverage point for ethics integration into the design process. Framing the problem to include access and equity led some schools to select a suite of strategies and technologies and construct a multi-layered solution. For example, some schools chose worked with local public television or radio stations to offer free instruction or leveraging mobile infrastructure for phone- and tablet-based solutions (see for example Rauf, 2020; World Bank brief, 2020, on global use of edtech during the pandemic).

Gray and Boling (2016) also noted how designers or teams facilitated stakeholder input and buy-in, which helps designers reveal assumptions and their own culture and values they bring to the project as well as share design agency in the process for including diverse cultures and values. A process that engages stakeholders is key to enacting ethics in design and to representing diverse, possibly conflicting, values to frame the problem more inclusively. Gray and Boling (2016) also identified designers who acknowledge the design response or product is situated in a specific social context and explore how their design is responsive to this socio-cultural reality through adaptation to context. Designers also highlighted inclusion and access, with multiple points throughout the design process—from learner characteristics to technology selection and materials development—where accessibility considerations can be woven in. Additionally, Gray & Boling (2016) noted designers who emphasized agency of the learner through student-centered instruction, endeavoring to maximize learner agency and autonomy. And finally, some designers articulated a design philosophy as their modus operandi or even engaged their collaborators and stakeholders in expressing a shared design philosophy for the project. In these cases, the designers framed their work to include both value statements on personal commitments (such as a commitment to accessibility) as well as statements on how their work is grounded in particular learning theories.

Moore & Griffin (2021) and Moore & Tillberg-Webb (in press) suggest questions and prompts for ethical considerations can be integrated throughout all stages of the design process. They propose approaches where critical questioning and reflection-in-action (Schön, 1983) are woven into each stage of design and development. For example, during the front-end analysis phases, designers can ask critical questions such as: How many learners have access to internet or mobile technology at home?; What accessibility barriers can be anticipated?; What are critical non-instructional needs such as health or safety that should be considered?; What infrastructure assumptions are being made?; And what are the potential benefits and harms? Reflective questions can be integrated throughout the design process, such as during strategy and technology selection decisions that identify diverse learner needs, or materials creation or selection that include criteria for how accessible or flexible the materials are or whether materials reflect any bias or discrimination. For practitioners who are in a planning or leadership role, front-end needs assessment questions based in Kaufman's strategic planning model (2000), which starts first with identifying societal needs, can help to frame desired impacts on inequalities, discrimination, access, the environment, and other broader social considerations.

As another emerging example in our field, Beck and Warren (2020) developed a framework to guide ethical instructional choices with learning technologies specifically for a K-12 context. Aimed at learning technology selection, the framework was created with teachers through a stakeholder-driven process. Their framework, Ethical Choices for Educational Technology (ECET), emphasizes *both* ensuring "students learn intended mental models of information" *and* "no harm comes to students because of using it." Their process similarly references micro, macro, and meso-level problems and impacts. Across these emerging studies and frameworks, consistent patterns suggest some convergence of ideas: framing problems to include both instructional as well as broader social issues; prioritizing ethical considerations alongside instructional; posing critical questions at every stage of analysis, design, selection, development, implementation, and evaluation; using a process of continual reflection-in-action or iterative evaluation; engaging stakeholders throughout the design process (not just during implementation); and articulating a design philosophy, whether individually or as a project team.

Where Do We Go Next?

While a survey of design models evidences some shortcomings, there is also clearly nascent energy and effort in addressing these gaps. These efforts may yet yield decision-making and design frameworks or guidelines or job aids to support practitioners, even those who are not professionals in our discipline but find themselves in support or decision-

making roles. However, this is presently an emergent area at best. If we conclude that the design models we have are not the ones we need, what then?

It may be quite difficult to give up existing models as a field, especially if instructional design continues to place a high value on the systematic reliability of these models, and there are many instances when this is an important consideration, arguably even an ethical one. For example, in military contexts, it is critical to generate reliable, replicable results because lives are at stake—a very clear ethical constraint. So perhaps then it is more desirable to append ethical considerations to existing models in order to preserve what works in existing models. While the military context may seem the prime example of why this approach might be preferable, it also demonstrates why this approach may not be sufficient. They are currently re-imagining their instructional systems framework, as they recognized there were mistakes and major ethical failures that showed up in the field caused in part by their reliance on systematic planning models. As one architect for the US Army learning strategy described, they were getting very efficient doing the same thing over and over again, continually solving some important problems but also continually solving the wrong problems (J. Ellsworth, personal communication).

Alternatively, the field could endeavor to develop fresh or revised models that situate ethical considerations more explicitly in the fabric of the design process itself. Or, the field could place less emphasis on design models and focus on design practices like problem framing, reflection-in-action, critical questioning, articulating a design philosophy, and engaging stakeholders. The efforts by Beck and Warren (2020) and Moore and Tillberg-Webb (in press) would certainly fall into one or both of these solution types. It is a classic change challenge: does the field iterate through incremental improvements or tear down the existing structures and rebuild, or completely rethink the underlying paradigms, and then worry about what is built on top of those new paradigms?

The military affords an example again of how incremental improvements or complete overhauls are not necessarily distinct options. When the military decided to revisit instructional systems design models, they began with option A but concluded that merely appending new considerations to existing models was not sufficient. This can lead to very uneven ad hoc processes and mixed results, which is to say undesirable results. So, they shifted to option B as an approach. However, they did not throw out the existing models because those models carry important expertise with them, especially for novices who suddenly find training or instructional development part of their job requirements, but they do not have a degree or background in instructional design. Like the questions and challenges raised in this article, so much had changed about the military's operating environment that something fundamentally new was required. An advantage of going back to ground zero (option B) was the ability to start with something fundamentally new as an organizing framework or at least as a core, then draw on existing systematic models to build something new incorporating the best of the existing (J. Ellsworth, personal communication).

Gray and Boling (2017) also suggest that instructional designers engage in critical design. This is not the same as integrating ethics into the design process, rather it is using design to bring awareness to critical issues. For example, they describe the *Pee Timer* designed to critique the use of surveillance in workplaces. Critical design aims to raise rather than answer questions, as a way to comment on the design itself, on the nature of design, and on the assumptions designers make. In order to do this, designers need the space, opportunity, motivation, and systemic supports to do so. Imagine an exhibit at a professional conference similar to the "Why Design Now?" where professionals in the instructional design field can showcase designs for good as well as critical designs that challenge designers to think by subverting and playing with ideas and assumptions. Other disciplines have also launched broad, collaborative efforts to articulate principles for ethical design, such as engineering through the Institute for Electrical and Electronics Engineers (IEEE). In 2019, IEEE published *Ethically Aligned Design* aimed at addressing ethical concerns around the design, development, implementation, and research of intelligent and autonomous technical systems.

I would like to end with a call for all of the above. By exploring a range of possible solutions and more openly deliberating about design practices, instructional designers can devise a suite of possible responses reflective of different contexts of needs and applications. What is most important is the field start by taking ownership of its role in the undesirable consequences of instructional systems and learning technologies. Instead of merely lamenting the unintended consequences, we signal our intention through design to figure out how we can shape it to be different, in

turn also supporting research on how we as a field bring our knowledge and methods to bear on complex social problems.

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Designing for Liberation: A Case Study in Antiracism Instructional Design

Ryan Ikeda, Kai Nham, Laura Armstrong, Fiona Diec, Nicole Kim, Douglas Parada, Diana Sanchez, Kelly Zhen, & Victoria Robinson

While grappling with the COVID-19 pandemic and the ongoing racialized, anti-Black violence, uprisings around the nation have launched anti-racism into popular consciousness and discourse. In higher education, many statements of solidarity with Black lives have been made with few structural changes offered or enacted. This essay positions instructional design as a material act that extends the organizing logic of education to learners and students (Harney & Moten, 2013) and offers anti-racism as a multimodal framework for instructional design centered upon dismantling the organizing logics of white supremacy and building liberatory possibilities, especially for Black, Indigenous, People of Color (BIPOC). The essay directs these questions and concerns to a case study, the Creative Discovery Fellows program (CDF) at U.C. Berkeley.

Introduction

This essay positions anti-racism pedagogy as a model of instructional design that seeks liberatory possibilities for students, instructors, and designers. Many attempts have been made to locate and situate anti-racism and anti-racism pedagogy in an historical and disciplinary context. For the purposes of this essay, we offer the following definition: *anti-racism is a systematic project seeking the reconfiguration and transformation of power, value, and resources that begins with identifications of conditions, constraints, and consolidation within a given system;* it is a materialist intervention. Anti-racism instructional design entails both rhetorical and infrastructural critiques, considering the relationship of part to whole, person to system, or individual to individuation; specifically, how one circulates and reconstitutes the other. That is, racism is inextricably linked to other systems of power and oppression, whose influence and dominance manifests in parallel hierarchies of difference, such as gender and sexuality. Relations, however ossified in appearance, remain dynamic, metastable, and co-constitutive; therein lies what Weheliye (2014, p. 2) calls "racializing

assemblages", or a reticulated space to maneuver, disrupt, and configure new possibilities - through instructional design.

Our inquiry centers on the following two questions; First, how do educators and students co-construct the disassembly of structural racism, inequity, and privilege while working within the constraints of higher education? Second, how might instructional design reflect multimodal political complexity and oppressive logics embedded in education while preserving utility and promoting effective teaching and learning strategies? We start by excavating the material situations surrounding instructional design in its attempts to create instructional models that correspond to material life. Here, we draw attention to the complexity, accuracy, and utility of these models, and consider to what extent they represent a racialized version of education. Next, this essay examines how anti-racism pedagogy reframes teaching as the organizing logics of domination, that is, white supremacy. Then, the essay identifies four principles of anti-racism pedagogy that may help to reconstitute the organizing logics of instruction away from interlocking systems of oppression, or what Collins (1990, p. 230) refers to as "the matrix of domination." The essay seeks to examine applications of the four principles into design practices employed by Creative Discovery Fellows program's (CDF) curriculum hub. CDF is part of the American Cultures Center at the University of California, Berkeley, and works across disciplinary boundaries to support equity-based learning outcomes by centering antiracist content. Lastly, the essay considers the liberatory possibilities anti-racism pedagogy may offer instructional design.

Positioning: The Materiality of Instructional Design

The movement from liberatory potential to liberatory possibility begins with an understanding of materiality, a multimodal awareness of how structure and system influence instruction. It may be helpful to think of liberatory potential as an imaginative exercise that exists primarily in a cognitive or discursive realm. Examples of liberatory potential might include applying theoretical frameworks to see current design models differently, redesigning logic models, or introducing new perspectives to field discourses. Much of our role as scholars investigates liberatory potential. In contrast, possibility refers to a material or structural change in the system of education that increases the mobility of its members and the circulation of its resources. Examples of liberatory possibility might include replacing merit-based grading systems with one centered on labor-based contracts, publishing perspectives and voices marginalized by education writ large, or allocating endowment funds to make space for an anti-racism research center. Potential is a matter of perspective and thus always present; for possibility to exist, it must be materialized. As such, a liberatory possibility involves a radical change to institutional structures at a classroom, department, or school-wide level.

Situating: Anti-Racism Strategies as Design Principles

Anti-racism pedagogy seeks to build liberatory possibilities for students. It is a contested project with a complicated history, a history and complexity that cannot be captured with all its nuance in this essay. For interested readers, selections such as Hooks' (1989) *Talking Back*, Collins' (1990) *Black Feminist Thought*, Wynter's (2003) "Unsettling the Coloniality of Being/Power/Truth/Freedom," Blakeney's (2005) "Antiracist Pedagogy," Leonardo's (2009) *Race, Whiteness, and Education,* Weheliye's (2014) *Habeas Viscus*, or Cheng's (2019) *Ornamentalism* provide a detailed and nuanced account of those complexities. Below, the aspects of anti-racism relevant to the Creative Discovery Fellows program at UC Berkeley are described.

Anti-racism pedagogy creates liberatory possibilities while simultaneously dismantling the interlocking structures of domination —such as, white supremacy, neoliberalism, and, among many others, structural racism —embedded in education. Both vectors of effect —creating and dismantling —are foundational to anti-racism pedagogy and rooted in historical projects like the freedom schools of the mid-1960s (Kelley, 2018). Through the CDF program, anti-racism pedagogy is characterized by community-engaged, project-based learning, collaborative design, and co-constructed systems of value that uplift the cultural values of BIPOC school members and their communities.

While there is no formula for antiracist pedagogy, most practitioners share the following three overlapping strategies. One, practitioners seek to confront systemic oppression[1] through instruction, design, and assessment. Two, practitioners locate precisely *how* and *where* systemic oppression functions within the material and structural conditions of the learning process (e.g., relational dynamics, assignment, assessment, exercise).[2] Three, practitioners reconfigure the material conditions of the classroom (i.e., curriculum, relational dynamics) to build new possibilities for all learners and educators, not just the benefactors from oppression.[3]

Mobilizing: Applications of Anti-Racism Pedagogy at UC Berkeley

The following section identifies four principles and four practices of anti-racism pedagogy operationalized by the CDF program at UC Berkeley in 2019-2021. (See Appendix A for more details.)

The Material Conditions Surrounding CDF

The CDF program formed in response to an inequity. While all Berkeley students pay for the Adobe Creative Cloud, only 14% of them use it. The software is a hidden cost bundled within tuition statements, and so most students are unaware of it. Further: there was a lack of support and scaffolding for students required to use the Adobe suite in classrooms. What emerged, then, was a situation in which all students paid for a service they didn't know existed and weren't trained to use. In response to this problem, a partnership formed between the Academic Innovation Studio (AIS) and the American Cultures Center (AC) to increase student access to the Adobe suite by providing technical support to instructors teaching AC courses and their students (See Appendix A). A private grant from the software company, Adobe, formalized this partnership in 2018.

To address the equity-gap, CDF employed an in-person cohort model that followed a twelve-month process moving AC instructors from course design and project development in semester one to implementation in semester two. Support centered on using innovative technology to amplify stories minoritized by dominant cultural frameworks. The fellowship supported a handful of instructors with both a stipend and pedagogical support that included three one-on-one consultations with the CDF team (i.e., design, scheduling, implementation), in-class demonstrations showing students how to use Adobe tools, and monthly workshops, which centered on different applications of technology, anti-racism pedagogy, and cross-disciplinary discussions.

The CDF team consists of teaching faculty, graduate students, undergraduates, university staff and administrators from fields as disparate as ethnic studies, data science, rhetoric, cognitive science, and law. None of our members are ladder-rank faculty, which means that we do not benefit from the institutional protections and privileges of tenure. Our status is peripheral to the symbolic and economic structures upholding an elite R1 university, which, consequently, positions anti-racism at UC Berkeley as an underfunded, fringe endeavor, flaunted but perennially underfunded — despite a near ubiquity of statements in support of Black lives across departments and administrative levels during summer 2020.

Stakes Surrounding Our Design Model

The structural and institutional circumstances surrounding CDF have directly informed our theorization of instructional design: design is a relational act that emerges from within a situational context and infrastructure that limit radical pedagogy to their structural conditions. Thus, in seeking to disassemble power, instructional design must account for the position of designers, their relationship to power and range of control, the underlying symbolic and material circumstances that compose the teaching situation, and the limits of infrastructure that contain and constrains instructional design. For the CDF team, our lack of tenure and the dwindling financial support from the university has shrouded the future of CDF with uncertainty and precarity. As much as our shift from in-person consultations to two online hubs (i.e., curriculum and student-support) was a response to COVID-19 and the global pandemic, it was also in direct response to the ephemerality of our team and a collective desire for anti-racism to outlast our tenure at the university.

The CDF team has arrived at an understanding of anti-racism that derives from our circumstances, as much as it is informed by our theoretical training, which we have concretized into four principles and four practices below. These offerings are provocations designed to spark conversation; they are not intended as totalizing conclusions. Further, these strategies extend and leverage historical conversations endemic to BIPOC communities and more contemporary ones led by Black queer organizers.

Four Principles of Anti-Racism Pedagogy

Principle 1: Dynamic Modeling

The first principle of anti-racism pedagogy centers on structural dynamism, creating a learning model that quickly responds to the slippery machinations of racism. Gillborn (2006, p. 26) describes racism as "a complex, contradictory, and fast-changing: it follows that anti-racism must be equally dynamic." CDF operates from an understanding that our education system is *not* broken, rather it is built to produce inequity. From its conception, the "American" classroom has served as an arm of industrialization and the white supremacist and settler colonial project of the United States (Melamed, 2006; Carl, 2009; Garside, 2020). Therefore, no amount of labor or reform can "fix" it. Disassembly is required for transformation.

Principle 2: Process-Oriented Pedagogies

A second principle centers on process-oriented pedagogies. Process is the political vector of pedagogy because it describes the relational dynamics positioned by learning and teaching. The emphasis of process-oriented learning and iterative design emerged organically among the multidisciplinary, cross-hierarchical CDF community. Process-oriented pedagogies facilitate student choice and learner development by attending to the mechanism, or how, of learning (Littlewood, 2009). We've expanded the idea of process to include the acts of curriculum and instructional design, collaborations among teachers, the relational dynamics between students and teachers, and student to student, the multiplicity of force relations imposed onto learning and carried into the classroom by students. In our application, process-oriented pedagogy takes on a stereoscopic form that emerges directly from the different ways our team members occupy space on campus.

Process-oriented learning differs from content-oriented strategies, such as the inclusion of diverse and underrepresented voices. On this distinction, Wagner (2005, p. 263) writes: "Content cannot be conveyed unless the process is first carefully developed and cultivated...what is most significant intellectually is not where we end up but how we go about getting there." Extrapolating her critique into an anti-racism framework she describes how the process will create "a richer learning environment, as the learning occurs in an unusually deep manner as students are engaged at both a cognitive and affective level" (Wagner, 2005, p. 272). The centering of effect is a necessary challenge for anti-racism practitioners to take up, as conversations about positionality, power, and value acknowledge the emotional and sensational lives of students that are always present in the classroom, but seldom welcomed in or engaged pedagogically. An invitation to process-oriented learning, then, is also an invitation to recognize that students (and teachers and designers) are more than just cognitive beings, that emotions, sensations, and feelings are integral parts of learning.

Principle 3: Material Conditions & Relational Dynamics

Lynch et al. (2017) discovered that most anti-racism pedagogical peer-reviewed research centered and uplifted the experiences of white educators, white students, and white cultural projects. That is, Lynch et al. (2017) discovered that anti-racism endeavors are just as likely to reinforce white supremacy as non-antiracist strategies. For anti-racism practitioners, it becomes necessary to sit with two interrelated "discomfiting propositions" (Leonardo & Manning, 2015, p. 27) revealed by Lynch et al.'s research: well-intentioned design strategies intended to disrupt whiteness often uplift it; and more egregiously — many anti-racism projects uplift whiteness by co-opting Black imaginaries. As Givens (2021) demonstrates, anti-racism is endemic to the Black community for whom anti-Black violence is a material condition that is daily felt. The centrality of Black educators to the design and teaching process directly increases Black student mobility (Gershenson et al., 2018). What Lynch et al.'s research observes may be described as yet another appropriation

of Black culture by whiteness, and perhaps yet another example of what Bell (1980) has referred to as interest convergence, where the advancement of BIPOC folx is encouraged so long as it affirms the supremacy of whiteness.

Our third principle foregrounds the material conditions surrounding BIPOC students and the relational dynamics that position them in subordinate, marginalized, or peripheral roles. Without such awareness, designers are likely to design for themselves (Carter & Goodwin, 1994; Bartolomè & Trueba, 2000), revert to the default conditions of whiteness (Manning & Leonardo, 2015), or extend the organizing logic white supremacy (Harney & Moten, 2013).

Principle 4: Accountability

Lastly, accountability to BIPOC stakeholders is necessary to ensure anti-racism delivers on its promises of structural and institutional change. Gillborn (2006) identifies a contradiction among practitioners that (painfully) recalls arguments against multiculturalism. "Anti-racism established its credentials by exposing the deeply conservative nature of approaches that struck liberatory postures but accepted the status quo and frequently encoded deficit perspectives of Black children, their parents, and communities" (Gibbons, 2006, p. 12). In other words, anti-racism benefits the institution. It has become institutionalized, expressing the logics of domination (i.e., Harney & Moten's concept of the commons) entailed by the university instead of delivering on its liberatory promises.

The next section explores our attempts to mobilize these anti-racism principles into our praxis, by asking: *how do we design a learning model that seeks to center community-based learning practices, uplift BIPOC students, and dismantle the matrix of domination, while working within the parameters of UC Berkeley?* The following pages examine four practices that emerged from our discussions.

Four Practices of Anti-Racism Design

Our approach to anti-racism instructional design is two-fold. First, we developed a 15-week process-oriented, anti-racism curriculum applicable to cross-disciplinary instructors in Science, Technology, Engineering, and Mathematics (STEM), social science, and the humanities that centers on dynamic antiracist learning activities. (See Appendix B.) Secondly, we created a student hub that supports students in American Cultures courses using the Adobe Creative Cloud. Our student hub integrates anti-racism principles into platform-based guides (e.g., "how to create a Spark presentation"). Underlying these two digital centers are four practices of anti-racism design discussed below.

Practice One. Accountability to BIPOC Communities

Learning doesn't happen in a cultural vacuum; it occurs among people and their material circumstances. As educators, we are beholden to our stakeholdersato students and their communities, to our teaching teams and departments, to our disciplines and professional memberships, and to the institution of higher education. Our first—and overarching—anti-racism practice relates to community accountability.

First, we are accountable to our design team. We've approached instructional design as a collective activity and not an individual exercise. Our design team includes representatives from many of the stakeholders in higher education, from undergraduate and graduate students to instructors, program directors, and administrators; from humanities to STEM-based specialists.

Second, in addition to an array of different stakeholders on our design team, we've structured the process of design itself non-hierarchically; that is, we've attempted to challenge the very organizational logic of the university that positions research faculty above teaching faculty above students (and all the elided nuances in between). Each team member specializes in a particular aspect of the instructional process (e.g., student-facing Adobe tools support) that they contribute to building out. However, the instructional design process is collective, which means we are all bringing valuable insight and knowledge into the process, regardless of how we specialize. In this way, we are iterative and incorporate feedback into the process continuously. The desired outcome is to uplift and honor the multitudes of knowledge that stakeholders bring to the table from our various experiences and positionalities. Third, we are accountable to the students and instructors that we support. Our team collects qualitative and quantitative data from our Fellows, their graduate student instructors (GSIs), and their students through interviews, focus groups, student

responses, reflections, and self-reporting, which we aggregate, analyze, and interpret based upon a design-based framework (Wang & Hannafin, 2005). The data we receive ensures that our methods are grounded in the material experiences of students and instructors; it also informs how we frame, position, and develop the curriculum and student hubs. From our research, we've found that the precipitating inequity, the lack of student engagement and understanding with the Adobe Creative Suite, was successfully addressed, as all students reported an increased aptitude upon completing participatory courses. (See Appendix E).[4]

Table 1

CDF Anti-Racism Practices

Practice	Description	Design Strategies
(1) Accountability to BIPOC Communities	Designing with our specific stakeholders—that is, our students and their communities, our teaching teams and departments, and our disciplines and professional memberships.	• Building a multiple-stakeholder design team • Engaging community scholars • Collectivity • Data-based self-reflection • Integrating stakeholder feedback
(2) Situational Awareness	Valuing our students' experiences outside the classroom Designing with the situational factors that impact student learning process	• Pre-survey of stakeholders • Co-constructing the learning process with stakeholders • Changing the referent of grades (e.g., shifting from merit-based values to labor-based ones)
(3) Positional Awareness	Making visible one's own bias, racial identity, and ideological/political commitments	• Implicit Association Test • Journey Mapping: mapping one's journey as both a student and an educator • Locating (a) one's self and (b) students among "the matrix of domination"
(4) Representational Awareness	Investigating the role of power in the design process	• Designers describe their positionality to subjects • Visual & Discourse analysis for racial tropes • Providing a rationale for any omissions, elisions, and oversights of stakeholders

Practice Two. Situational Awareness

The first practice asks instructional designers to identify what we assume we know and what we want to know about the students and instructors we support.

The first tactic is a pre-survey in which we modify the instructional design process in response to students' needs. (See Appendix D). In our pre-survey, we ask questions such as: How many hours do you have to devote to this course beyond its scheduled classes? What constraints might affect your participation in this course? Are there any accessibility needs/proven ways that I can support you? The desired outcome is to create a learning process that works within the material circumstances of our students, rather than assuming the general, institutionalized heuristic applies (e.g., students have 9-hours available per week for a 3-unit course).

A second tactic is to cede control of the learning process back to students by opening the syllabus to their input within the first week of class. While this may sound chaotic, it can be quite controlled, asking, for example, whether an attendance policy seems fair. The purpose is not to be performative, but to involve students in the instructional design process, and to invite their participation in structuring the course itself. Another example is the use of labor-based

grading contracts as a systemic way of ceding control to students. In either case, by opening the instructional design process to students, designers materialize their pedagogical schema among the particularity of students' circumstances, recruiting all students and their expertise and not excluding them.

Practice Three. Positional Awareness

Our second practice centers on positional awareness, that is, thinking about how our experiences as students and community members are activated through the instructional design process. The desired outcome for positional awareness is three-fold: to confront any unconscious bias we may have before building it into the learning process (Fiarman, 2016), to develop "ideological and political clarity" (Bartolomè & Trueba, 2000) as a precondition to equity, and to identify how our racial identities show up in the design process (Wagner, 2005).

Our approach is granular and begins with a single assignment, which is then analyzed individually for bias in its framing, organization, uses of the English language, and metrics of value. Each member reviews the same assignment, and then we discuss what we have observed (i.e., unconscious biases, ideological or political undercurrents, and racializing forces. The design team can help reveal impacts unseen or unperceived by individual designers, although we recognize that this is limited by our own positionalities as well. Creating a space of humility to articulate the ways power manifests in our design has allowed us to be more honest and vulnerable in our growing process.

A second approach to positional awareness is for designers to contextualize their curriculum design in terms of their experiences and identities. Such practices are well-worn from an academic perspective, where we are asked to directly identify the theorists, histories, and disciplinary frameworks in relation to our research and design. Formats may range from paratextual inclusions, such as footnotes or endnotes, to more integrated versions weaved into the essay itself.

Practice Four. Representational Awareness

Over the past couple of years, our team has supported instructors from departments as varied as Ethnic Studies, Engineering, Theater, Dance, and Performance Studies, Integrative Biology, Geography, Comparative Literature, and Environmental Science. Our Fellows design courses that center on human subjects. They ask their students to conduct original research and then narrate their findings to their audience. Students are tasked with representing human life quantitatively or qualitatively; that is, they are asked to tell stories. Storytelling is an influential act; it is not neutral.

Our fourth practice, representational awareness, seeks to excavate power through the relational dynamics involved in storytelling. It builds from the preceding three practices of community accountability, situational awareness, and positional awareness. It asks instructional designers to build a process of storytelling for students that is tethered to their researched communities, the underlying material circumstances, and the power dynamics activated through the storytelling process.

Strategies include discourse analysis. Discourse analysis is a meta-level critique where students identify disciplinary tropes and constraints after reviewing an array of journal articles; here the question centers on how does integrative biology, for example, tell the story of human variation? The objective of discourse analysis isn't to answer the question per se, rather it is to draw critical attention to how a field or discipline approaches that question by inductively examining its literature.

A more discrete strategy asks designers, instructors, and students to describe their relationship to their subjects in one prepositional phrase. Once identified, students, instructors, or designers can discuss the power dynamics entailed by such prepositions. For example, we explore Nancy Chan's interview (1992) with filmmaker Trinh Minh-ha, where the latter explains how and why she uses "speaking nearby" to describe how she represents her subjects. (Others have included: "speaking for" or "speaking with".) This analysis is rhetorical, analyzing the structural relationships construed by each prepositional phrase.

We found that most students' presentations feature at least one image representative of their research or researched community. Since CDF courses center on issues of race and equity, it cannot be assumed that students won't accidentally circulate a racist image or a historically racist trope. A third strategy centers on analyzing the use of images

in students' projects, which we model first for the whole class, then practice together with a crowdsourced image from the students' projects, and then ask each project group to practice again by analyzing one image from their research. For example, in one class, we explored the (problematic) use of Black hands through a cell door as the cover image for a research project on the prison industrial complex.

It is common for Diversity, Equity, and Inclusion (DEI) design strategies to approach systemic oppression positively, relying on tropes like inclusivity and diversity to circumscribe the imaginative possibility of anti-racism according to the pre-existing system. However, these tropes neglect the structures of exclusion underlying education that make such additive gestures (e.g., freedom, inclusivity, voice, and diversity) necessary in the first place.[5] Adding more participants to an inequitable system doesn't change its unjust structure but obscures it. A fourth tactic is a framing exercise that encourages designers, instructors, and students to approach storytelling as an exclusionary act by recognizing that storytelling is a privileged position available to some. Our term, constrained-based storytelling, reframes representation in terms of power and privilege. As much as stories uplift and center certain experiences they do so to the exclusion of others, where many of these "others" have been historically excluded, minoritized, and erased from instruction. Instructors consider the following reflective questions as they design their curriculum: Whose stories are being centered? Whose stories are being told by members outside of their community? Who decides which stories can be told?

Opening: Further Possibilities

Descriptively, anti-racism pedagogy designs a multimodal learning process that moves fluidly among individuals, institutions (i.e., schools), and educational infrastructure; it situates learning as a political activity and simultaneously confronts the purportedly de-politicized framework of education. Under an anti-racism instructional design framework, the physical location (i.e., campus, classroom, seating chart), its figurative entailments (i.e., educational imaginaries, pedagogical frameworks and epistemologies), the cultural, economic, and political constraints brought into instruction by its participants and the way in which these larger systems impose onto instruction and its participants, are engaged, critiqued, and thusly repositioned—at least perceptively. The hope of liberatory projects is not only epistemic but also material, to shift not just paradigms but structures, institutions, and relational dynamics positioned therein.

Footnotes

[1] In Black Feminist Thought (1990) Patricia Hill Collins introduces the concept of "the matrix of domination" to reframe oppression from an oppositional binary toward an interlocking system of forces, such as a race, gender, and class, that reticulate subjects differently at different times and among different spaces. For examples of antiracist pedagogy, see Leonardo and Manning (2015), where they apply a critical race theoretical lens to group work, demonstrating it to be a space for whiteness and white cultural expressions—in the absence of direct antiracist instruction.

[2] Asao Inoue (2019), for example, examines the role of merit-based assessments in terms of their longstanding alignment with hierarchy and white supremacist valuations of knowledge. His labor-based grading schema seeks to restructure grading systems away from so-called intelligence-based testing models and toward student labor. Inoue targes one specific aspect of the instructional design process (i.e., assessment) to critique the whole model.

[3] Through the undercommons, Harney and Moten (2013) attempt to expose fissures in the presumed epistemological foundation upholding instruction to reveal underlying political projects; it advances a new instructional design paradigm. Their project posits instruction as an institutional logic that seeks to organize and to discipline its subjects according to of hierarchical value and not, as it purports to be, to teach content. The undercommons recontextualizes instruction (and instructional design) as part of the infrastructure that reinforces the institutionality of the university against the independence of its subjects (i.e., students, teachers, instructional designers). It suggests that learning is always already mediated by an intervening political project that absorbs into its systematicity any attempts at disruption.

[4] The American Cultures Center has a program called American Cultures Engaged Scholars program, or ACES for short. Its focus centers on building bridges between institutionalized forms of knowledge, modalities circulated and regulated among disciplinary spaces, with community organizers, members, and groups. In other words, the ACES program has developed community-based accountability through its course projects. While there is some overlap between ACES scholars and the CDF program (i.e., some ACES instructors have received fellowships from CDF), CDF lacks explicit accountability with community members beyond the university system. We hope to build such bridges during future semesters.

[5] As per Sylvia Wynter (2003) and Alexander G. Weheliye (2014), freedom and voice are predicated on the historically-constructed liberal subject, a term with roots as far back as the Enlightenment. Accordingly, liberalism posits its subject, called the human, as a self-possessed, autonomous individual. For our purposes, it is important to designate the human as a historical figure that has emerged among a particular situation and context (i.e., political, economic, imaginative) that, through its ubiquity, has become a generalized referent for our species and not, as Wynter (2003) describes it, as a one possible "genre" of experience.

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Appendix A

CDF Curriculum: Where and How it Shows Up on Campus

The Creative Discovery Fellows program provides anti-racism pedagogical support to instructors at UC Berkeley teaching the American Cultures course requirement. The American Cultures Center is a multidisciplinary teaching hub composed of faculty members from an array of STEM, Humanities, and Social Science departments, all operating from a common equity-based framework. Interested faculty must apply and then submit their course design for review by an AC committee before their course can receive AC status.

The American Cultures course requirement is the only universal graduation requirement for all undergraduates at UC Berkeley and is the largest curriculum on campus—to date, it has enrolled one million students. The AC requirement was installed in 1991 because of student petitions for a mandatory requirement for all students to learn about non-Western, non-White cultural perspectives. For UC Berkeley, the requirement signified a new, responsive approach to the problem, encountered in numerous disciplines, of how better to represent the diversity of American experience to the diversity of students we now educate. Ling-chi Wang, emeritus professor of Asian American Studies, called the American Cultures (AC) Requirement *"one of the most important curriculum-reform projects in the history of this campus. American Cultures challenges each discipline to raise questions that they had never raised before, and in the process, they have uncovered unknown aspects of their own disciplines."*

As CDF, a subsidiary of the AC Center, our project was to revamp the already stellar AC curriculum by designing an anti-racism pedagogical process that supports its commitment to antiracist content. For example, an AC course from the Ethnic Studies department may already feature a reading list centered on non-White thinkers and artists, but the instructor needs support to cultivate a learning process that decenters whiteness and uplifts BIPOC thinkers and artists structurally. Our role, in other words, is to challenge white supremacy and racism by designing a curriculum that enacts structural changes to the teaching and learning process. By leveraging what Harney and Moten (2013) refer to as the "prophetic" role of teaching, AC instructors change the organizational framework of UC Berkeley.

Appendix B

CDF Curriculum: An Overview

Given the move to remote learning, and our withdrawn funding to support individual instructor support, our team decided to build a process-oriented anti-racism curriculum to support instructors of the AC requirement. AC instructors come from a multiplicity of disciplinary backgrounds and so we needed to create a dynamic and modifiable curriculum that supported STEM, Humanities, and Social Science instructors teaching the AC requirement. Focusing on anti-racism content felt like an irrelevant task and a poor use of our time because of the sheer diversity of disciplinary fields

represented by our participating instructors. That is, antiracist content in an Integrative Biology course looks different than anti-racism content for a Social Sciences course.

Instruction is common to all AC courses. Rather than attempting to build a curriculum centered on content that might be relevant to a few instructors, we built a 15-week curriculum centered on an anti-racism learning and teaching process that all instructors could use. The curriculum is organized by week and theme and features a series of process-oriented activities. These activities (listed below) require 15-20 minutes of participation and are positioned as complementary to the content- or product-oriented learning outcomes of the AC course. Each activity is designed to confront white supremacy and whiteness structurally, that is, by asking students and instructors to participate in the instructional process differently.

The curriculum hub has an iterative design, which means it retains an open structure. Participants are encouraged to modify, adapt, or innovate its exercises, pacing, and themes to fit the material conditions of their course. Our curriculum is also elective. We invite participants to lean-in and use activities, sections, or sequences that are relevant to their instructional practice in the context of their disciplinary constraints and department requirements. As Gillborn (2006) argues, racism is dynamic and so the open, modifiable process-oriented curriculum is our way of maintaining our mobility, responsiveness, and agility.

Appendix C

CDF Curriculum: Week-by-Week Schedule

The following table identifies the weekly themes and activities. Appendix D provides examples of our process-oriented activities.

Week	Theme	Activities (selected)
0	Community Building	● Making Space for Students ● Welcome Survey
1	Introductions	● Who We Are ● Rumors and Hearsay ● Community Agreements
2	Community Agreements	● Show-N-Tell ● Power Mapping
3	Project Overview	Compelling Stories
4	Proposal	Proposal Reviews
5	Positioning Histories	Lit Review
6	Narrative as a Rhetorical Act	Speaking Nearby
7	Discovery & Data Analytics	Cultural Formation of Data
8	Situational Subjects	Stakeholders
9	Storyboarding & Representation	Children's Books: Ideology and Visual Analysis
10	Drafting	Writing Blocks
11	Peer Reviews	Peer Reviews

| 12-14 | Writing, Reviewing, Revising | Synchronous & Asynchronous Plans |
| 15 | Closing Rituals | Cultivating Joy |

Appendix D

CDF Curriculum: Sample Activities

This section features a couple of activities featured in the CDF Curriculum. Each activity is an entry point to an aspect of anti-racism, that is, enacting structural changes to education through learning and teaching. As an entry point, each activity presents participants with an opening that is also unfinished; each activity requires participants to "complete" it —that is, to modify or adapt to fit the constraints of disciplinary courses. In this way, our activities emerge from our (the CDF team) teaching practices, they come from a particular time and space. Our intention is to affirm the materiality of instruction in all its particularities and to resist the commodification of educational technologies synonymized by the ditto. That is, anti-racism requires more levels of engagement than a cut-and-paste approach to design. But we also don't want to isolate or to shame instructors teaching in unsupportive environments, lacking in institutional support, and/or material resources, for whom a cut-and-paste approach is all they have time for. These activities are complete-enough to be directly implemented.

Sample Activities

- **Week 0, Activity 1: Pre-Course Survey**

Instruction begins when we first reach out to our students. When and how we extend that initial welcome often determines how students show up in class, which parts of their identity they share, which cultural experiences and training they leverage. Students carry into the classroom their affective dimensions and cultural background, whether they are acknowledged or not. For deep learning to occur, that is, the kind of learning to work against the narrow visions of whiteness, instructors must invite the effect into the room (Wagner, 2005).

- **Week 6, Activity 1: Speaking Nearby**

Week 6 centers on the role narrative, representation, or storytelling plays in assigning power and value to subjects. It situates students' research as an exercise of power that grants subjectivity to some while objectifying others. This process of assigning object or subject status often occurs without question. During this week, students excavate the embedded and assumed power dynamics latent in their research or represented through disciplinary content. Activity 1 derives from the antiracist pedagogy of educator and filmmaker, Trinh Minh-ha (1992).

- **Week 9, Activity 1: Ideological Analysis**

The following exercise occurs well into the semester. As Leonardo and Manning (2015) observe, unsupervised group work often reverts to its default cultural conditions, which is whiteness. While other, earlier activities develop antiracist group work strategies, it is assumed that those structures are in play when, under Protocol A, it asks for "project groups".

Pre-Course Surveys

Week 0, Activity 1

Premise. As teachers, we have often designed our courses in a vacuum, responding to department protocol or standards. We often ask our students to adjust to the department, school, or your preferences. Teachers usually don't know who we're teaching - what their prior training is, the expertise they carry, the material conditions that compose their learning environment, the economic constraints that may limit the time allotted for your course, etc. - until after the semester begins. In other words, we make quite a few assumptions about our students without asking for their input.

Purpose. The purpose of the presurvey is two-fold: on one hand, it is to gain situational awareness about our particular students and, on the other, it is to adjust the course design, projects, schedule, and outcomes to fit their needs, availability, and access while still upholding whatever external standards, benchmarks, or protocol requisite of the course.

Preparation. Think about what you wished you knew at the beginning of a semester, but don't until after you get to know them. Alternatively, think categorically about what you don't know about your students. Come up with a series of questions that will address your knowledge gaps and can be answered by students in a short period of time (e.g., 10-15 minutes). Using Google Forms or another easily accessible platform, compose the survey. When you send it out, be as transparent as possible: clearly state its purpose, its deadline, what you will do with the information, with whom it will be shared, and how they will know you've reviewed it.

Protocol. After you've welcomed students into the class and invited them to take up space, then send the follow up survey. The more lead time you give yourself, the more responsive you can be to your students (i.e., the less stressful it will be to make adjustments before the semester begins). Once you've distributed the survey with a clear manageable deadline, then review the results and identify clear ways to adjust. Taking it one step further, you can then share how you've adjusted the course to fit student needs during the first week of class (or whenever you share your syllabus).

Pre-survey Questions [sample distributed via Google Forms]

The following presurvey helps me understand more about who you are. One of the challenges as a teacher is that when I design a class, I do so without a concrete awareness of my students. The purpose of this survey is to help me understand more about you, your interests, and your situation. With the results, I will adjust course requirements, schedule, and projects, and will specify where changes have been made when we rewrite the syllabus together on the 4th day of class.

1. In your own words, what is this course about?
2. What life experiences can you connect to its central themes?
3. What do you hope to learn?
4. What do you hope to contribute?
5. On a scale of 1-4, with 4 being super excited and 1 being utter agony, what is your level of excitement for the course?
6. Including this course, how many courses have you enrolled in this semester?
    1. 1
    2. 2
    3. 3
    4. 4
    5. 5+
7. What is the primary way you will access this course?
    1. Laptop
    2. Desktop
    3. Tablet
    4. Phone
    5. Shared laptop, desktop, or tablet
    6. Other
8. Describe your home learning environment. (e.g., Where do you zoom? With whom? What does your 'classroom' look like?)
9. What language(s) do you speak at home?
10. From what time zone will you be joining us?
11. What challenges might you face while enrolled in this course? [Note: challenges may be internal to the course, such as content, or external to the course. Constraints may include: familial--childcare, adultcare, sharing laptops; health--global pandemic; social--police violence, educational racism, protests; political--government restrictions; economic--family business, employment. Answer vaguely, if necessary.]
12. Given all your time constraints, how much time do you realistically have for coursework outside of our synchronous class time?
    1. 5 hrs/week or less
    2. 6-10 hrs/week
    3. 11-15 hrs/week
    4. 16-20 hrs/week

Speaking Nearby

Week 6, Activity 1

Premise. The relationship of storytellers to their subjects, objects, and systems is an under examined part of the representation process.

Purpose. The purpose of this exercise is to discuss the positionality of storytellers two ways, in relationship to their subjects and socio-politically.

Preparation. Students review an early 90s interview with documentarian Trinh Minh-ha, as she discusses her positionality as a filmmaker.

Protocol. In writing groups, define "speaking nearby" and differentiate from at least three other prepositions (e.g., speaking for; speaking with). Applying this heuristic, review one image and one prose document to describe the relationship of the storyteller/photographer to their subjects. As a class, one representative from each group shares one insight from their writing groups before opening it up to a discussion that addresses the following questions: how is the positionality of storytellers related to anti-racism? Based on my research, how have writers historically positioned

themselves to their subject? Based on our field, how do writers in _____ discipline position themselves to their subjects? What affordances and limitations have these configurations engendered? How do I position my creative discovery project "nearby" its subjects?

Children's Books: Ideology and Visual Analysis

Week 9, Activity 1

Premise. Starting with familiar, easily accessible texts, like children's picture books, helps them gain experience practicing a new form of analysis (visual rhetorics) in a playful, low-stakes way that directly informs their own storytelling practices.

Purpose. This exercise provides students with a playful, fun approach to visual rhetorics by analyzing picture books.

Preparation. Select a series of children's picture books (e.g., *Cece Loves Science*; *Not Quite Snow White*; *Babar and His Children*; *Anti-Racist Baby*; *Five Chinese Brothers*; *Steam Train, Dream Train*). Upload to Canvas, Drive, or whichever educational platform employed by your course. Invite students to select one story to read and analyze among their project groups or assign them one to read. (Note: if you assign different stories to different groups, a secondary presentation in which groups can present their "findings" to another group. This helps develop confidence, experience presenting stories, and, horizontally, circulates different analytical approaches across the class.)

Protocols.

1. A) In project groups, invite students to read a children's story to uncover its ideological background based on comparative analysis of its images, characters and characterization, plot, tone, and mood.
2. B) A second approach invites students to reverse-engineer the story based upon its images. Here, students block out the text and excavate the plot, characters and characterization, and ideology by attending only to the images.
3. C) Applying to each group's project-narrative, invite members to think through the ideological and political commitments surfaced through their selected images, characterization, and plot points.

Appendix E

CDF Curriculum: Fall Student Survey Results, 2019

The following graphs have been taken from an internal research report administered by Laura Armstrong during the Spring and Fall semesters of 2019. The first figure reveals that students increased their comfort-level using Adobe tools during our CDF courses.

Students reported significant changes in their comfort using
Adobe tools **before** and **after** completing CDF courses.

Tool	Before	After
Spark (N = 61)	1.5	3.3
Illustrator (N = 61)	1.9	2.9
Photoshop (N = 42)	2.5	3.1
InDesign (N = 20)	1.5	2.8
Premiere (N = 18)	1.8	3.2
Audition (N = 13)	0.7	2.9
Other (N = 11)	3.4	3.6

0	1	2	3	4
I had never used this tool	Very uncomfortable	Somewhat uncomfortable	Somewhat comfortable	Very comfortable
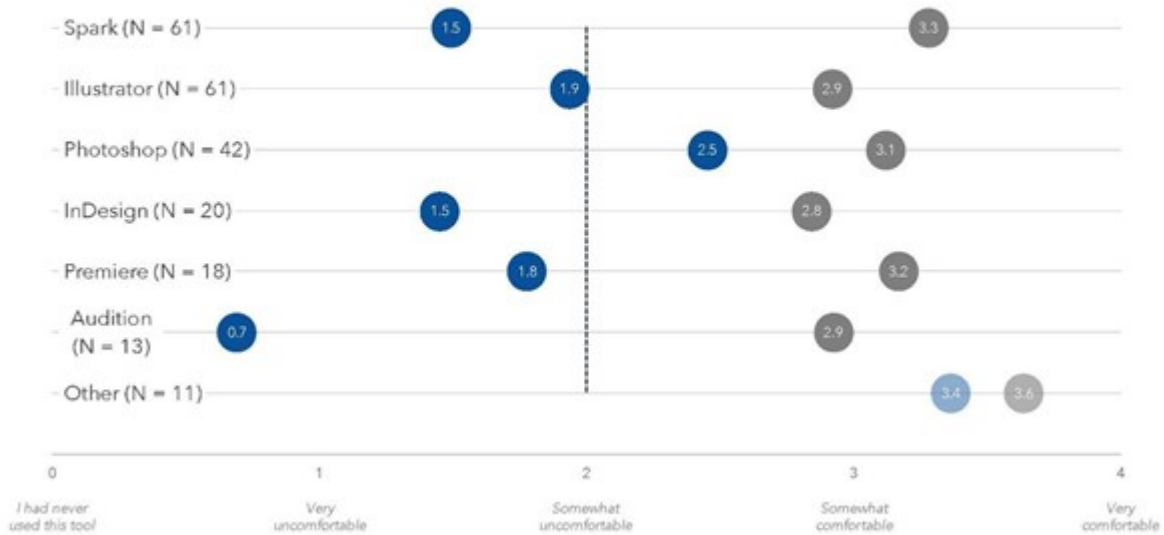
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Kai Nham (he/they) is a Ph.D. student in information studies at UCLA. His research interests include examining the ways dominant data systems impact trans and gender diverse communities of color, as well as the development of community-based interventions and technologies to resist violence and build new futures.

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Promoting Organizational Justice In Cross-Cultural Data Collection, Analysis, And Interpretation: Towards An Emerging Conceptual Model

Lisa A. Giacumo, Madeleine MacDonald, & D'Jeane T. Peters

Marginalization   Instructional Design   Cross-cultural   Empirical Data Collection   Human Performance Improvement

Ethical Methodology   Organizational Justice

Human performance improvement (HPI) practitioners, including Instructional designers (IDs), typically strive to inform inclusive, equitable, and socially just organizational development, workplace learning, and performance improvement decisions when working across cultures. The intention behind these types of decisions is to avoid causing harm to organizational members and the larger societies they serve. One way researchers, IDs, and HPI practitioners can support inclusive, equitable, and socially just organizational decision-making is by operating under organizational justice theory. In this work, we describe how organizational justice theory can be applied by practitioners in cross-cultural data collection, analysis, and interpretation project work.

Introduction

Recently, human performance improvement (HPI) professionals, instructional design (ID) practitioners, and scholars have started to focus on cross-cultural data collection, including overcoming cross-cultural barriers and collaboration (Sands et al., 2007; Peters & Giacumo, 2020). Simply put, cross-cultural data collection takes the form of interviews, surveys, questionnaires, focus groups, and other approaches in which HPI professionals, IDs, and scholars collect data in cultural contexts from which they do not originate (Peters & Giacumo, 2020). Ethical and methodological challenges are apparent in cross-cultural data collection; there are often barriers that emerge due to tension between cultural identities, unequal power dynamics, gaps between ethical guidelines across academia, and the ethical norms in different cultures (Peters & Giacumo, 2020). These issues are particularly problematic if the researchers are from a different culture than their research participants (Shordike et al., 2017, p. 286) or the context of the instructional design (Romero-Hall et al., 2018).

One recommendation for improving cross-cultural data collection is to include multiple perspectives in decision-making. A number of studies show how including multiple perspectives from all relevant components of an organizational system and individuals from selected populations can help improve workplace learning, general operations, and organizational performance (Asino et al., 2017; Breman & Giacumo, 2020; Breman et al., 2019; Liamputtong, 2008; Peters & Giacumo, 2020; Peters & Giacumo, 2019; Ramos-Burkhart, 2013; Smeds & Alvesalo, 2003; Young, 2008). Yet, notably missing from the performance improvement standards and literature is any direct discussion regarding *how* organizational justice issues or power differentials can affect organizational settings, culture, and performance improvement goals, as well as the organizational positions and/or societal experiences of an organization's members.

We posit that the gap in the literature exists because including multiple perspectives and representatives of stakeholder groups in the research process is not enough. As Guerra (2006) remarked, "The field of performance improvement should . . . help practitioners add a demonstrable value to the field and society as a whole." (p. 1025). To add demonstrable value to the field and society, attention must also be spent on ensuring that cross-cultural data collection is grounded in principles of fairness, inclusion, and dignity.

Asino & Giacumo (2019), noted how it is important for practitioners to enable performance improvement and workplace learning that is responsive to the unique cultural needs of specific target populations. Errors made in cross-cultural contexts can cause harm to individuals and their relationships with others, as well as ineffective interventions and financial strain on organizations (Littrell & Salas, 2005). However, Peters & Giacumo (2020) noted a dearth of guidance for researchers and practitioners collecting data across cultures. This lack of guidance can be detrimental to organizational performance and workplace learning efforts in multinational and national organizations.

The purpose of this paper is to offer HPI professionals, which includes instructional design (ID) practitioners and scholars, guidance on achieving organizational justice in cross-cultural data collection by being responsive to the cultural needs of individuals and communities. We started with the guidelines offered by Peters & Giacumo (2020) but realized that it was not designed for issues of social justice. Hence, we combed the literature on organizational justice and used that lens to integrate social justice within Peters & Giacumo's (2020) guidelines. With this new organizational justice lens, we propose an augmented conceptual model in this article. To achieve this aim, we consulted existing professional standards that offer insight into promoting organizational justice. Therefore, our new combined conceptual model offers HPT practitioners guidance to support cross-cultural data collection and analysis that is equitable, inclusive, and socially just.

This study is significant because although some theoretical methodological guidance for conducting HPI research and practice across cultures is emerging, more research is needed to advance equity and inclusion practices in HPI. Organizational leaders, researchers, and practitioners can each have more power than the individuals they support through ID and performance improvement interventions. This power differential may come from economic, historical, political, or other factors (Liamputtong, 2008). By understanding this differential, researchers and practitioners can begin to acknowledge and correct systemic oppression of marginalized populations and individuals both internal and external to the organizations they serve (Guerra, 2006; Morris and Bunjun, 2007). Therefore, we seek to address one research question: *How can IDs and Performance Improvement Specialists support socially just decisions regarding workplace learning design and organizational performance improvement?*

Cross-Cultural Data Collection Guidelines: Peters & Giacumo (2020)

There are a number of common barriers and issues that can arise before, during, and even after cross-cultural data collection takes place. Participants can be wary of the researcher because of the researcher's demographics (age, sex, status, gender, class, race, ethnicity, etc.; Shah, 2004; Rubin and Rubin, 1995). Additional barriers include the interviewee not feeling comfortable discussing certain topics, concerns about confidentiality and power dynamics between themselves and the researcher, and ethical differences. (Adler et al., 2001 & Ryen, 2001, quoted in Sands, 2007, p. 355; Honan et al., 2013). Reluctance may also be based on concerns that members of the dominant culture will use the interview to further institutional agendas and legitimize social inequalities (Briggs, 2001, quoted in Sands, 2007, p. 355).

To help researchers and practitioners develop more inclusive and equitable practices, Peters & Giacumo (2020) presented a series of seven practical guidelines for practitioners who work across cultures as shown in figure 1.

Figure 1

7 Cross-Cultural Data Collection Guidelines
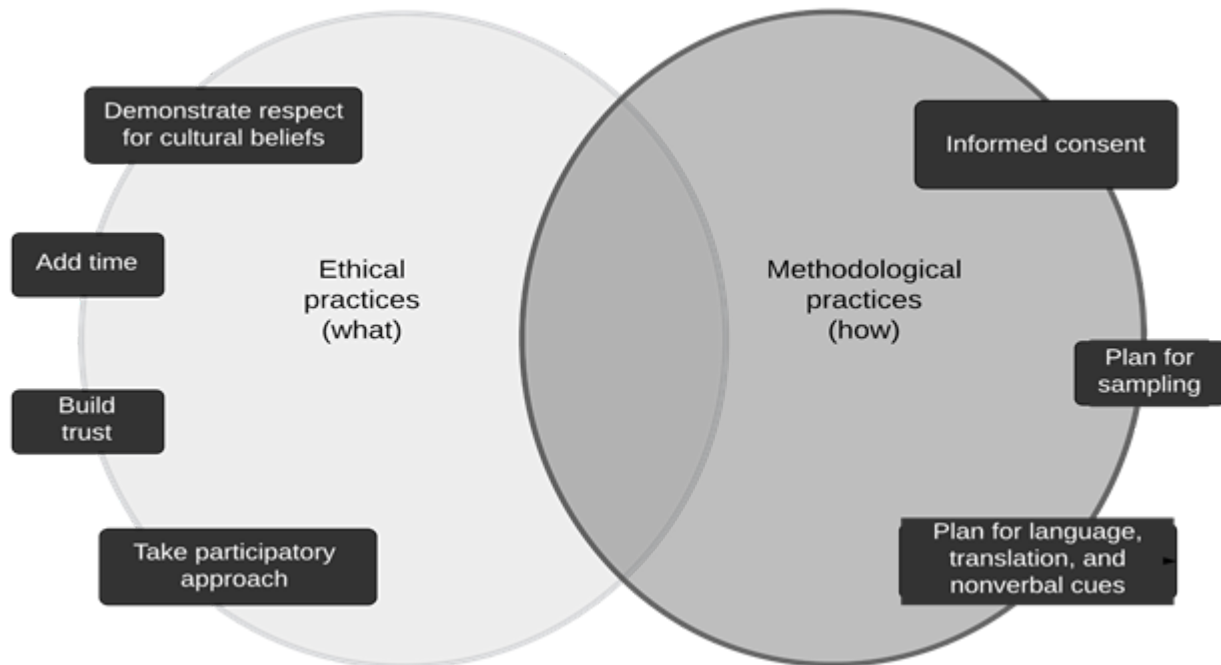
Four ethical guidelines and three methodological guidelines are shown to overlap.

These guidelines were drawn primarily from the fields of sociology and anthropology. They fell into two major, but overlapping, categories: ethical considerations (i.e., what should be) and methodological considerations (i.e., what should be done). Peters and Giacumo (2020) suggested four ethical considerations practitioners should consider when preparing to collect data across cultures, including how they can: *build trust* through a shared rapport (see also Jennings, 2005), *add time* to account for increased project complexity, *demonstrate respect for cultural beliefs* by intentionally considering their own cultural values through the practice of reflexivity (see also Levitt, 2015; Guerra, 2006), and *take a participatory approach* by treating the data collection as a collaborative partnership (see also Liamputtong, 2010). In addition to these ethical considerations, the authors suggest that there are three practical, methodological elements to successful cross-cultural interviews. These included how they can: ensure communication through effective use of *language, translation, and nonverbal cues,* employ fair *sampling* strategies, and ensure that *informed consent* takes into consideration the power differential that may exist between data collector and participant.

Missing from these guidelines, however, was a cohesive theory that could be utilized to support socially just decision-making and interactions in organizations and in cross-cultural data collection projects. Also missing was evidence from the literature showing how HPI practitioners might follow these practical guidelines and respond to the results they see in their field. In short, we saw that applying these guidelines alone might not reliably yield: 1) desired organizational performance improvement outcomes or 2) improve an organizational system to be more inclusive, fair, and just, both of which are central to our personal motivations for engaging in performance improvement.

Organizational Justice in HPI Data Collection Across Cultures: Synthesizing Existing Perspectives

In this section, we provide a brief review of literature. We begin with an overview of organizational justice theory and then summarize the standards and principles for organizational justice offered by various professional societies. The

review underpins our emerging conceptual model and recommendations for work towards achieving organizational justice with cross-cultural data collection.

Organizational Justice Theory

Social justice is most commonly understood as the relative balance or fairness between individuals as well as large social groups, through comparing wealth, liberties, and equal opportunities (Banai et al., 2011). Greenberg (1990) suggested that early theories of social justice applied to organizations have evolved into the concept of organizational justice. Organizational justice theory suggests the more organizational members perceive decisions and interactions within the organizational environment as fair and just, the more engaged and productive they and the organization become. Members' perception of fairness, which is part of the practice of organizational justice, influences organizational citizenship and decreases counterproductive behaviors (Latham & Pinder, 2005), and increases job satisfaction and organizational loyalty while decreasing turnover (Fatt et al., 2010).

Recent researchers point to evidence that organizational justice affects a variety of aspects of organizational performance (Ambrose & Cropanzano, 2003; Moon, 2017) and workplace learning (Oh, 2019; Sartti, 2019). Researchers have investigated this theory across a wide variety of cultures and organization types (Zaman et al., 2010; Al-Zu'bi, 2010). Researchers also use this term to describe a broad category of study including fairness, equity, ethics, equality, and behaviors in organizations (Colquitt, 2008; Cropanzano & Stein, 2009; Hoy & Tarter, 2004). Organizational justice is also known as the relative balance or fairness and moral or ethical treatment of individuals within an organization (Cropanzano et al., 2007; Rausch et al., 2005).

One commonly accepted model of organizational justice consists of three dimensions: distributive, procedural, and interactional justice (Karriker & Williams, 2009). Distributive justice is the relative balance or perceived fairness of outcomes such as compensation, office assignment, promotions, job titles, and other similar decisions that affect members of an organization (Karriker, & Williams, 2009). Procedural justice is the relative balance or perceived fairness of the processes through which outcome distributions happen vs. "how the systems or procedures 'should' operate" (Karriker & Williams, 2009, p. 114). Interactional justice is the relative treatment of interpersonal communication (Simmons, 2010), which is "usually operationalized as one-to-one transactions between individuals" (Cropanzano et al., 2002, p. 329) often with regards to courtesy, respect, honesty, and dignity (Weldali & Lubis, 2016). We can draw upon these theoretical constructs of justice to frame HPI practices.

Professional Standards and Principles Associated with Organizational Justice

Guerra (2006) remarked that HPI professionals add value by consulting with clients in ethical considerations as well as performance standards. Although there are a number of sources that can guide organizational justice in data collection, we draw largely on The International Society for Performance Improvement's (ISPI) and the Academy of Human Resource Development (AHRD) in this paper because are considered the go-to sources for practice in the field of instructional design and performance improvement.

Four of ISPI's Ten Standards (n.d.) address organizational justice directly. These include: (1) take a systemic view, (2) ensure solutions' conformity and feasibility, (3) add value, and (4) work in partnership with clients and stakeholders (ISPI, n.d.), and (5) the integrity principle. In other words, practitioners should be inclusive, aware of social and cultural factors, and ensure the recipient recognizes and benefits from the intervention.

The first two standards, *take a systemic view* and *ensure solutions' conformity and feasibility,* specifically direct practitioners to examine the relationship between context and the proposed intervention. In practice, this means that if IDs or HPTs need to collect data, they will possess at least a base level of understanding of local laws, customs, and politics so they can ask interviewees thorough questions. The third ISPI (n.d.) standard, *add value* recognizes "competent practitioners" as those who can improve project outcomes through their expertise. When working with clients who wish to improve workplace learning or organizational performance in a cross-cultural setting or avoid causing unintentional harm to members of marginalized groups, they are able to better estimate the time and effort required for data collection processes. Therefore, they are better able to estimate risks and costs associated with their

data collection plan. The fourth standard, *work in partnership with clients and stakeholders*, requires practitioners to keep all parties involved in each part of the project.

ISPI's (n.d.) *integrity principle* requires honesty and truthfulness in our work with clients and others (Guerra, 2006). In collecting data from participants who are from another culture or marginalized groups, the practitioner will take additional time and resources to ensure the participants are informed about the risks and benefits of their participation and any proposed intervention. A trusting, collaborative, and informed interview will generate more accurate data and lasting partnerships (ISPI, 2021). In other words, practitioners should be collaborative, honest, and build trust between themselves, participants, and clients.

In addition, the Academy of Human Resource Development (AHRD) Standards on Ethics and Integrity list 5 general principles for professionals. Namely, professionals recognize the boundaries of their own competence, respect people's rights and dignity including their privacy and confidentiality, are aware of racial, socioeconomic, language differences and refrain from discriminatory practices, and take on a social responsibility to promote human welfare (AHRD, n.d.).

A Conceptual Model for Organizational Justice and Cross-Cultural Data Collection: Blending Organizational Justice Perspectives with Cross-Cultural Data Collection Practices

In light of this gap in research and practice to advance equity and inclusion in ID and HPI work, we are taking Peters and Giacumo's (2020) practice guidance for cross-cultural interviewing and framing it within organizational justice to build a conceptual model for data collection. We see this as a new conceptual model that brings new considerations to light. Those considerations emerge when the constructs of organizational justice – that is, distributive, interactional, and procedural justice - become central to the Peters & Giacumo (2020) initial practice guidance. For example, when HPI practitioners and scholars work towards achieving distributive justice, or balance equity, equality, and needs. During decision making, organizational members would become more satisfied with decisions and their outcomes (Yang et al., 2019). When HPI practitioners and scholars work towards achieving procedural justice, or improve policies, procedures, and processes, for all groups of affected stakeholders, organizational members become more satisfied with the organizational system and subsystems (Kim & Beehr, 2020; McCluskey et al., 2019). HPI practitioners and scholars can also work towards achieving interactional justice, which entails improving how individuals are treated in interpersonal and informational communications to ensure they are treated with respect, kindness, politeness, dignity, and transparency, and access to information (Siachou et al., 2021). This has been associated with organizational members becoming more satisfied with their relationships in the organizational system and subsystems, thus leading to improved performance (Ahmad, 2018; Leineweber et al., 2020).

Further, as shown in figure 2, each of these three justice types overlap with each other. This means that perceptions of one type of organizational justice can mediate or influence another type of perceived organizational justice (Zhang et al., 2017). For example, Rhoades et al. (2001) noted that interactional justice in the form of supervisor support has been found to affect perceived distributive justice as their treatment can be ascribed to the organization's policies. Johnson et al. (2014) noted how engaging in procedural justice work can be costly and draining, resulting in less ability to regulate emotions and thus decreased perceptions of interactional justice. Posey et al. (2011) found that perceptions of procedural injustice arising from computer monitoring activities influenced perceptions of distributive justice. Thus, the three types of justice (i.e., procedural, distributive, and interactional) together influence perceptions of organizational justice.

Figure 2

Three Components of Organizational Justice
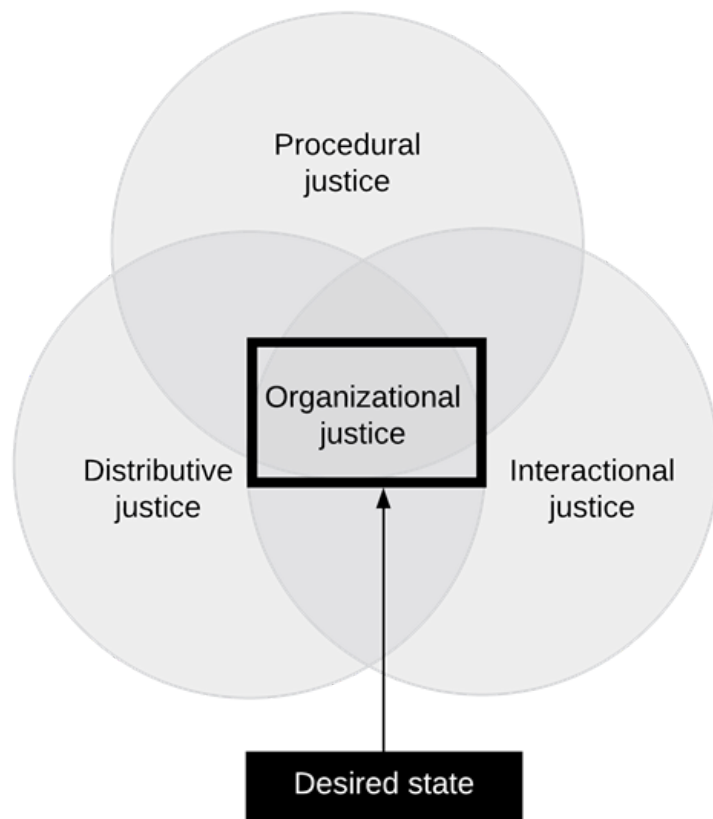
Procedural justice, distributive justice, and interactional justice are overlapping components of organizational justice theory.

Adding these constructs to the Peters and Giacumo (2020) guidelines brings a new lens of social justice into focus. While an HPI project may be untaken with the goal to improve an organization's performance through addressing related policies, procedures, processes, and informational communications, which have been at the heart of HPI work since its inception, it should be not only ethically responsible but also socially just. In effect, we posit that HPI practitioners have an added responsibility when working with organizations to work towards organizational justice, as this is also correlated with improved organizational performance. To justly advance organizational performance, HPI practitioners would also explicitly address issues related to equity, equality, human needs, and interpersonal communication, in their work with stakeholders in an organization. In short, the HPI projects would be done in ways that yield fair, equitable, and culturally responsive outcomes, through respectful, transparent, communications, and do not overburden any stakeholders or individuals they are meant to serve.

With this new lens, each of the original seven guidelines would take on a new light. For example, Peters and Giacumo (2020) recommended to build trust with our clients and stakeholders, suggesting to recognize the sensitive nature of historical power differences between groups (see also Chistopher et al., 2011), taking time to answer questions authentically, while communicating the associated benefits and risks with those affected by our work (see also Guerra, 2003). If we center trust building in distributive justice, we may also only agree to work for clients in organizations [or on project scopes] who [that] would endeavor to work towards equitable or needs-based resource allocation aligned with organizational performance improvement goals. And, also to share these goals in our communications with all stakeholders for purposes of accountability.

Even taking a participatory approach would take on a new responsibility when distributive and procedural justice are considered. Traditionally, you would have participants play a role in determining what is important in a project and/or shaping data collection, analysis, and reporting methods. There's typically still a lack of awareness or consideration of the benefits and drawbacks of engaging in this kind of work. if you don't also include the client organization and/or

participants in discussions about the longer-term change implications for equity, equality, needs, policies, procedures, and processes in the organization and community. For example, a tradeoff of building more efficient transportation systems or infrastructure can affect businesses, communities, and families, when for example, historic routes or time frames are altered and have potential to become isolating for at least some. Tradeoffs should be made transparent and clear to participants early on and chosen with appropriate buy-in.

With the addition of these new organizational justice constructs, we augment the Peters and Giacumo (2020) guidelines into a conceptual model. Along with this augmentation, we also suggest three updates to the Peters and Giacumo (2020) guidelines. The first change that will be revealed in the conceptual model is to revise one component name from the former model – *informed consent*. The second change is to add one new component to the conceptual model – *plan for logistics*. The third change is to share empirical evidence to further substantiate the component named *add time*. These updates, described below, reflect the need for a conceptual model language that applies to practitioners and not just academics.

Informed Consent

Previous research situated in academic contexts used the term *informed consent* (Peters & Giacumo, 2020; Liampatoung, 2008). This specific term is tied to the guidelines under institutional review boards to mitigate risk, ensure safety, protect participants' confidentiality, and respect participants' privacy, which often requires soliciting informed consent ("Institutional Review Boards Frequently Asked Questions," 1998). However, as Bies (1993) notes, organizational justice theory, specifically procedural justice, speaks more broadly to care for protecting the safety, confidentiality, and privacy of organizational members. This extends beyond the IRB framework, which only refers to direct study participants. Further, with interactional justice and the dignity of our clients in mind, we can also change the title so that practitioners are better able to recognize the application in practice without a sole reliance on jargon that's familiar only to academics. Therefore, one update we make in the conceptual model we introduce in this article would be to add "*informed participation consent to ensure safety, confidentiality, protect privacy, and describe potential benefits and limitations*" and specify that all stakeholders, all organizational members, and participants, should be made aware of these associated methods and project plans.

Plan for Logistics

We suggest adding *plan for logistics* as one new component of the conceptual model we introduce in this article as well. We make this recommendation because the planning required to collect data across cultures often requires acquiring new expertise, even for those who are familiar with data collection planning in their own cultures. Researchers have shown that infrastructure such as roads, internet access, phone systems, postal services, electricity access, even the ability to gather in any single physical location, can be limited or change frequently and often unexpectedly (Breman et al., 2019, Gitau et al., 2010; Mercer, 2004; Rao, 2005). Our own research and HPI project work also confirms a need for more informed logistical planning.

Add Time

Last, we expand upon the component *add time* in the augmented conceptual model we share in this article. While Peters & Giacumo (2020) illustrated why additional time would be necessary in a cross-cultural data collection effort, they did not point to any previous research in their article that had explicitly stated that additional time is necessary. However, that may have been a limitation of their literature review process because a closer look does reveal that literature does point to the significant amount of time required to conduct valid performance improvement projects across cultures (Bamberger et al., 2010; Cullen et al., 2011; Powell et al., 2010). It should be noted that these two components, *plan for logistics* and *add time* have a strong relationship. We have again found that in order to overcome logistical issues, the researcher or practitioner may have to add more time into the data collection process.

Combined Organizational Justice and Cross-Cultural Data Collection Conceptual Model

As shown in Figure 3, we propose a visual representation of the emerging combined organizational justice and cross-cultural data collection conceptual model that further demonstrates the relationships of the perspectives combined in this paper. At the center of Figure 3 is the theoretical model of organizational justice, including procedural, distributive, and interactional justice (DeConinck, 2010). Achieving organizational justice in cross-cultural data collection helps to ensure the organization's decisions are trustworthy (DeConinck, 2010). For example, one can undertake a participatory approach and not plan for appropriate sampling or safety and then not meet the goal to contribute to a trustworthy, and socially just organization.

Figure 3

Organizational Justice and Cross-Cultural Data Collection Conceptual Model
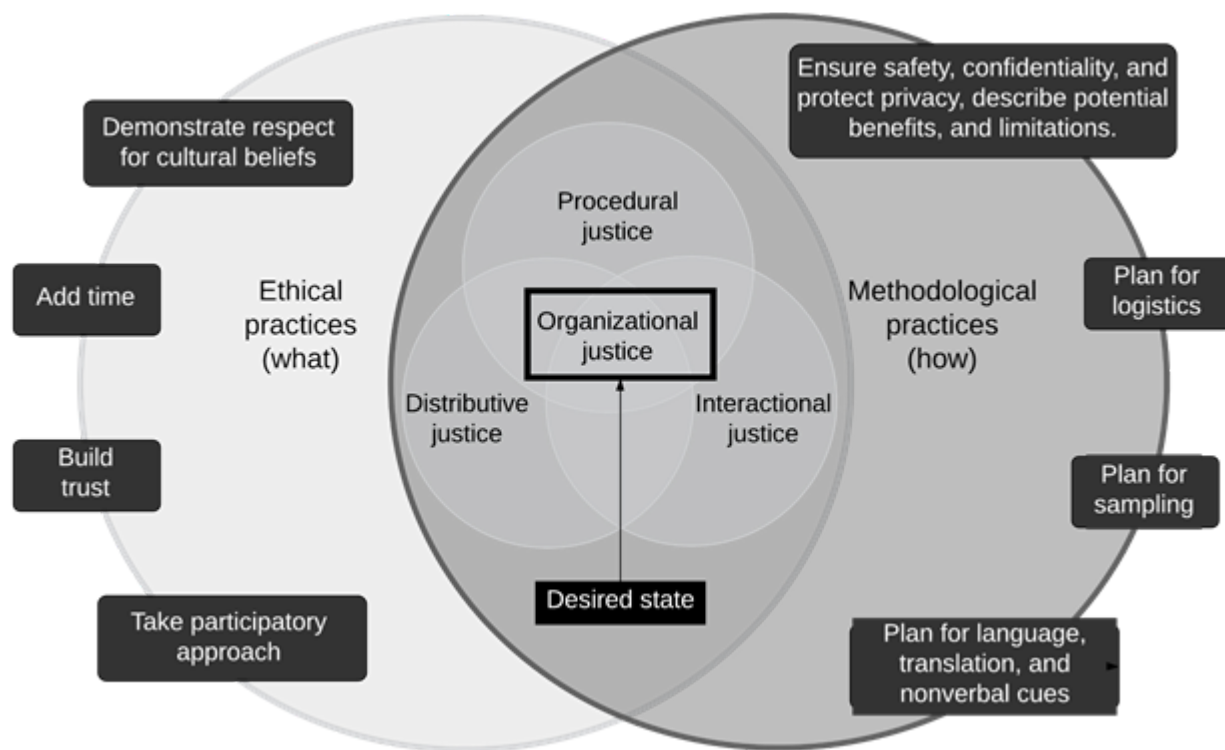
This figure illustrates the components of the organizational justice and cross-cultural data collection conceptual model.

We center this model within the components of cross-cultural data collection because the approaches we describe to gather valid and reliable data rest squarely on the principles of fairness, equity, equality, and ethics. That is to say that for a socially just organization to achieve distributive justice, the resources required for data collection efforts, both economic and social, must be allocated fairly (Ferrell & Ferrell, 2008). Similarly, for a socially just organization to achieve procedural justice, the data collection systems and procedures used to obtain outcomes, would be configured so as not to overburden or under-benefit any single person or group (Ferrell & Ferrell, 2008). Interactional justice, or the way individuals are treated, has been positively related to knowledge-sharing behaviors in organizations (Li et al., 2017). Li et al. (2017) suggested that if data collection efforts are welcoming and inclusive, or participatory in nature, while maintaining all stakeholders' and participants' dignity, respect, and safety, more knowledge would likely be shared.

Implications

Below are six practical implications and recommendations for researchers and practitioners and one practical implication for organizational leaders. Each implication is linked to at least one component of organizational justice (e.g., distributive justice, procedural justice, interactional justice). These implications can be used by practitioners, scholars and leaders alike, to help ensure project designs communicate these considerations with all stakeholders.

Involve Local Representatives and Translators When Translators Are Included

We recommend identifying representatives who are familiar with both cultures, and translators from the local culture, who are interested in working on the project before data collection and analysis. This recommendation aligns with interactional justice, by showing respect for the information and time that participants shared. Ideally, we recommend including these individuals in project planning and scoping who are also familiar with the desired performance domain.

Translators from the community are better adept at understanding the dialect, nuance, politics, and beliefs of the culture. A local translator may also help with access to people that might otherwise be wary of outsiders. In the data analysis phase, translators can also be helpful in explaining cultural norms, tone, and meaning. Involving locals in your project is generally recommended to attain buy-in from your participants. Similarly, even when a translator is not included in a project a local representative who knows both cultures will be able to interpret meaning and nuances you may otherwise miss (Breman et al., 2019).

Discuss Long-Term Project Implications for Participants And All Stakeholders

By taking a participatory approach early on, practitioners and academics can have more confidence that their project will be accepted by their participants and other stakeholders. However, applying distributive justice to a participatory approach from the project inception will likely lead to more useful, sustainable, and appreciated project outcomes. This means that stakeholder and participants' direct input and potential experiences are considered when prioritizing needs, desired outcomes, and potential future pathways forward. It also means that serving the principles of equity, equality, and human needs, elevates the importance of planning for a robust sampling strategy. This is a great way to build trust in the community or organization through ensuring you build in processes and procedures for collecting this input as part of your approach towards procedural justice.

Explain Protections, Potential Benefits, and Limitations to Participants

Plans should start early in the project design to protect participants' confidentiality, privacy, safety, and ability to share. This is an applied example of a procedural justice in action (e.g., policies, procedures), ensuring a supportive environment free from retribution and supportive of optimal learning, development, and organizational performance. To demonstrate respect and dignity (e.g., interactional justice), participants should be able to understand these plans, which may require translation into their language. This work will likely also help participants to perceive distributive justice when decisions are made later on regarding resource allocation, which can support their satisfaction with the outcome or decisions as a result of their participation.

Before soliciting information from participants, professionals should inform the participant of the purpose of the data collection, the benefits and risks of participating, plans to maintain participants' confidentiality and any associated limitations with these plans; how personally identifiable information will be secured, how the results will be shared, and how the raw data will be disposed (Peters & Giacumo, 2020).

Offer to Conduct Data Collection in A Location Or Mode That Is Most Comfortable For The Participants

Participants may have different histories and cultural norms for sharing information. Practitioners also have to consider the power dynamics between themselves, data collectors, and participants. We recommend asking the participant to choose the data collection location at a place (e.g., physical location, time) or mode (e.g., in person, by phone, by video

conference) most comfortable or convenient for them. This recommendation is aligned with interactional justice (e.g., can increase relationship satisfaction) and procedural justice (e.g., can increase system satisfaction).

Build Extra Time into Your Project Schedule

Practitioners and researchers should recognize the extra workload associated with collecting data across cultures. Overcoming language barriers and logistical issues such as finding a local translator or traversing muddy roadways will obviously require more time. What may not be so obvious is the additional time needed to ensure ethical and responsible data collection. When working with marginalized groups, especially those that are wary of outsiders, building trust, gaining access, and forming partnerships will take more time.

It can be challenging to estimate how much "more time" one will need, which can hamper efforts to secure additional funding or resources from organizations and donors. However, the practitioner and researcher have a responsibility to recognize their own limitations. If more time cannot be allotted to overcome methodological and ethical issues, data collected may be overly biased, unreliable, and invalid. More importantly, rushing through ethical and methodological considerations can harm the organization and individuals you are working with and undermine or prevent future opportunities.

Practitioners and researchers can employ a few tactics to address time concerns by working with local representatives early in the scoping process to determine risks and appropriate mitigations, the feasibility of the project plan, if there is interest in the potential outcomes, and if people are willing to participate.

Making space for this additional time will likely lead to higher perceptions of organizational justice all around. More valid and reliable data can support both distributive justice (e.g., decisions regarding resource allocation, equity, equality, and human needs) and procedural justice (e.g., decisions regarding policies, procedures, and processes). Sharing information and updates regarding the project timeline and the work being done to consider the client's and stakeholders' needs can also support interactional justice.

Start Building Trust Early

Practitioners working across cultures should determine how to build trust with the groups and individuals they will work with, recognizing that different approaches may be better suited for one group of people, but not appropriate for another group. For western researchers and practitioners working in marginalized communities, building trust can be more challenging. Ethnic and racial minorities, for example, may be hesitant to speak with project personnel because of past injustices. In these situations, you should plan to spend additional time building trust aligned to the ways trust is created in any specific group or community(ies), which demonstrates diligence towards achieving distributive justice.

Thus, we must be aware of how we are viewed by those whom we endeavor to serve and how those views can affect data validity. Not only will this allow for better data collection planning approaches in any organization but also considers the sensitive relationship between organizations headquartered in affluent societies and organizations from historically marginalized societies or backgrounds. With this information, we will likely work towards improved interactional justice as our communications can be more cohesively designed to better demonstrate respect, dignity for the individuals, organizations, and societies we serve. Therefore, we can draw upon this conceptual model not only to facilitate an understanding of power, but to push towards respectful and feasible solutions in our theoretical and organizational research (Morris and Bunjun, 2007).

Set Organizational Standards to Achieve Distributive and Procedural Organizational Justice

Thus far, our implications have been directed at practitioners and academics gathering data in cultural contexts they may be initially unfamiliar with. These changes cannot be effectively implemented, however, without the support of the sponsoring organization or community. Sponsored projects will struggle to meet their methodological and ethical considerations as long as businesses and universities fail to accept organizational justice as a guiding principle. Therefore, sponsoring organizations should develop a supportive organizational culture, ethical standards, and

methodologies, for employees working across cultures. This would facilitate individuals' work that prevents harm to participants, improves data validity, and achieves better outcomes, including return on investments or return on expectations. In addition, adoption of an organizational justice component to a data collection model can support employees by allowing more clear expectations and resource allocation for projects. The model should be considered a "jumping off point" for discussion. Further discussion of best practices for protecting participant privacy, while also delivering results to clients, could be a useful way for practitioners to share knowledge and develop professional skill sets.

For Future Research

This is a preliminary study to initiate development of a conceptual model designed to facilitate achieving organizational justice in cross-cultural data collection. The findings support the initial literature review conducted by (Peters & Giacumo, 2020). Additional research should consider attempts to validate or extend the practical guidance that application of this model can offer, further development to potentially lead to a more robust conceptual model of the approaches described, and stronger links between perceptions of organizational justice and cross-cultural data collection project organizational performance improvement outcomes. Further investigation could also demonstrate the extent to which researchers and practitioners believe in the need to implement components of the model in their data collection planning. This type of validation could then facilitate building a competency model to guide researchers and practitioners. Additionally, future work could be positioned to ask practitioners how they first learned to work across (workplace training, reading, personal interactions), which could provide more context for analysis.

Limitations

As part of our reflective process before, during, and after the data collection process, we acknowledge how our self-identities as university-educated, white, female, may influence both our line of questioning and our conversations with research participants. We acknowledge that while it is impossible for any data collection method to be free of power dynamics, the researcher or practitioner can use data collection tactics that reduce harm to their participants and their organizations. We acknowledge that we have only been informed by previous research published in English and available in our university libraries. Further, there may be relevant research available that did not appear in our search results. Other research, especially in other languages, and library collections we cannot access, all may add new perspectives to our understanding in this area.

Conclusion

By tying ethical and responsible cross-cultural data collection methods into the theoretical constructs of organizational justice, we can begin to drive towards developing a more robust theoretically grounded model. The conceptual model provides a necessary foundation upon which to anchor effective workplace learning, instructional design, and performance improvement efforts. In order to engage in HPI work to benefit marginalized populations, one must engage in critical reflection on how to avoid unintended consequences and systemic oppression. In addition, there is potential to further explore a variety of conceptual models, as well as a set of validated best practices to guide project planning and implementation. More research is needed to explore the relationships between organizational justice theory and practical instructional design and human performance improvement applications.

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Reconsidering Dale's Cone: Towards the Development of a 21st Century "Cone of Experience" to Address Social Justice Issues

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Social Justice   Instructional Strategies   Technology Trends   Dale's Cone of Experience

With the overarching goal of understanding the full scope of recent technology trends, this position paper developed an initial framework of possible instructional technologies and their potential impact on social justice issues. To construct this framework, an analysis of technology trends during the last 11 years was conducted. Our emerging framework includes 11 primary technology trends categories. In addition to describing this framework, specific social justice instructional activities in utilizing Molenda and Subramony's (2021) communication configurations, as well as elements of the Cone of Experience described by Dale (1969), are proposed.

Introduction

In this position paper, we examine technology trends over the past ten years and consider how these trends may impact educational experiences about specific social justice issues. We attempt to address two broad questions that incorporate the intent of this special issue, namely, how can the Learning Design (LD) discipline promote social, political, and economic change? and what prescriptive advice can we provide to designers to create effective instruction for this type of issues? Our aim is to create a toolbox that includes recent technology trends that an LD professional could leverage to develop and deliver effective social justice education.

Application of Hoban, Dale, and the Cone of Experience on Social Justice Issues

Fortunately, our Audiovisual Education predecessors have proposed guidelines on the role of instructional media and its impact on instructional outcomes. Almost eighty-five years ago, Hoban et al. (1937) laid the initial framework

acknowledging the relationship between types of media (such as visual aids) and student experience for optimal educational outcomes.

In other words, as students advance, the preferred educational approach should be adapted from more concrete visual aids or media experiences as opposed to abstract visual aid or media experiences. This concrete approach espoused first by Audiovisual Education discipline is a critical component of an LD's toolbox.

Nine years later, Edgar Dale (1946) constructed a model known as the "Cone of Experience." Dale's Cone directly succeeded from Hoban et al.'s (1937) concrete-abstract continuum and Bruner's (1966) three major modes of learning (i.e., enactive, iconic, and symbolic). It illustrated the role of educational media in providing different types of educational experiences, from more direct, concrete experiences to more elaborative, rich experiences. In his book and subsequent editions, *Audiovisual methods in teaching*, Dale (1969) stressed the importance of developing rich experiences (p. 85) in order to provide learners' "rewarding, relevant experiences" (p. 52). Dale's Cone has provided a useful framework for educators to match their instructional media approach to their desired educational experiences. For example, the process of developing creative, rich learning activities such as a simulated cross-section model of an airplane and historical reenactments are the application of Dale's Cone (Acland, 2017). Hoban's original emphasis on matching instructional media to student experiences and Dale's well-known Cone of Experience are touchstones in connecting the universe of instructional media to the development of the most effective learning experiences.

A more recent clarion call for LD professionals and researchers is to advocate the consideration of a heightening awareness of social justice issues. Bradshaw (2018) aptly noted LD professionals now need to pay attention to how to address and prescribe instructional and non-instructional interventions from their respective toolbox. LD professionals now have the added responsibility of understanding and immersing oneself into the culture of a particular target audience, learners, stakeholders, etc. It is not only incumbent upon an LD professional to complete a modified version of the ADDIE process but then also going through a quasi-ethnographical process of understanding the culture of a specific group of learners (Asino, 2017). According to Hackman and Rausher (2004), the inherent characteristics of social justice issues are "social responsibility, student empowerment and the equitable distribution of resource" (p. 114). While these issues were not necessarily considered when Hoban et al. and Dale developed their respective frameworks, they are certainly worth considering in our present political and social context. Hoban et al.'s (1937) relatively simplistic concrete to abstract framework and Dale's modified framework or Cone of Experience focus on creating potentially effective social justice instruction by emphasizing the importance of making this type of instruction concrete and providing what Dale (1946) termed "direct purposeful experiences" (p. 111) in order for "permanent learning" (p. 51) to occur. Thus, both frameworks have the potential to improve the way that LD as a discipline can capitalize on current technologies to offer socially responsible designs that empower students and support the equitable distribution of instructional resources.

Purpose

With the goals of considering Hoban and Dale's respective efforts with a 21st century social justice lens (Bradshaw, 2018), we developed an initial framework of possible instructional technologies and their potential use for designing educational experiences that can impact key social justice issues. To construct this framework, we conducted an analysis of LD trends during the last eleven years (2009-2020) and then categorized these trends using Molenda and Subramony's (2021) *Communication Configurations and Methods*. These trends have been organized into an initial structure and we provide examples of how these trends may be used for education on social justice issues (e.g., climate change) in order to contribute to the aforementioned ID toolbox.

Methods

An emergent theme analysis approach was used to analyze recent technology trends and develop a structural framework for these trends. Our end-result, a framework, is an emerging, novel, and provisional construct for which the

primary purpose is to depict the overall picture of recent technology trends that have been developed over the past eleven years.

Overall Data Analysis Process

Data on recent instructional media and technology trends were drawn from several key sources, including book chapters, online reports, and podcasts. Each source was produced by reputable authorities in the LD discipline and was selected based on its scope and thoroughness. Because of the focus of this position paper is on recent trends during the past eleven years, only publications between the years of 2009 and 2020 were analyzed. We evaluated three primary technology trends sources for our data analysis: *Educational Media and Technology Yearbook*, *EDUCAUSE Horizon Report*, and the *Trends & Issues in Instructional Design, Educational Technology, and Learning Sciences* podcast. Data were then categorized into media types using the constant-comparative technique (Creswell, 2009).

After assessing category validity, recent technology trend categories were developed to define a descriptive framework for considering the affordances of these media formats. Each of these trends were the unit of analysis. Specific themes emerged from this analysis by using a constant-comparative technique (Creswell, 2009). Two researchers independently coded each of the identified technology trends. The researchers analyzed the data in multiple sets to help ensure accuracy in coding. After meeting multiple times, the researchers came to consensus on a final listing of themes. In addition, an implementation of Popadiuk and Marshall's (2011) reliability check, *comprehensiveness of categories* was conducted. In particular, prior to commencing the coding process, approximately 10% of the technology trends (n=81) were randomly selected and withheld. Once the themes were established, all of the withheld technology trends were successfully categorized using one the emerging themes/categories.

The last credibility check involved a review by an editor of an international journal in the LD discipline. This reviewer has more than ten years of experience as an LD faculty member and has been a co-editor of an LD journal for over five years. This faculty member reviewed the listing of themes and responded to three questions: a) are these categories useful in identifying recent technology trends? (b) are there any surprises with these categories? and (c) are there any omissions in these categories with regard to recent technology trends? This reviewer observed the following with regards to our proposed technology trend categories. He thought that our main categories: Devices, Ideas, and Methods were relatively on par or "decent" in representing the last eleven years of technology trends. He did suggest emphasizing the term, Functions; that is the function of a particular technology trend or "what things can do (or their functions)". He did not find any "surprises" but did emphasize the growing trend of "customization of instruction" while at the same time accentuating the non-digital learner and technology trends that could possibly support non-digital learning. One of his conclusions is that our LD discipline "needs more of a synthesis of empirically proven ideas" and is directly the emphasis of this position paper.

Data Coding

An initial manual coding was performed to distinguish trends from issues in the field. Trends were identified based on Reiser's (2017) definition of a technology trend: an "idea, device, or method" (p. 139). Issues were identified as broader concerns or developments in the field (e.g., policies, security issues, etc.) that do not provide a direct application to instruction. Two researchers independently coded whether entries should be classified as issues or trends. After meeting twice to discuss disagreements, full consensus was reached. Items identified as issues subsequently were removed from the dataset.

After the dataset was constrained to focus solely on trends (n = 1062), specific trend categories were identified using a constant-comparative technique (Creswell, 2009). Two researchers independently coded each trend in two main phases. In the first phase, each researcher independently generated media categories for each trend. Between the two researchers, there was 62.5% agreement during the initial coding process. The researchers met once to refine the list of categories by reviewing and discussing discrepancies. After consensus was reached, a final set of categories was documented in a codebook. In the second phase, the researchers independently re-assessed all disagreements to determine whether they could be appropriately categorized according to the codebook. After three rounds of coding, the researchers concluded with 99.3% agreement.

To further support the trustworthiness of the approach, the following credibility checks were implemented. First, as noted in the previous paragraph, researchers independently analyzed and coded the dataset in each round. After several stages, this process reached *coding exhaustiveness* (Butterfield et al., 2005). Second, Popadiuk and Marshall's (2011) *comprehensiveness of categories* reliability check was utilized. After the dataset was prepared and all items categorized as *issues* were removed, 10% of the remaining *trends* items were randomly selected and withheld from coding. After the codebook was established and all other items were coded, these 10% (n = 81) were coded according to the existing categories, ensuring completeness of the defined categories. Additionally, instructional technology trends identified in a resource not utilized in the dataset, such as Reiser and Dempsey's (2018) *Trends & Issues in Instructional Design & Technology* textbook and other relevant sources (e.g., Reiser, 2017), were informally assessed according to the codebook to evaluate category comprehensiveness; all of the identified technology trends were reflected in our framework.

Results

Our provisional framework is organized into Reiser's (2017) three characteristics of a technology trend, namely: "a new idea, device, or method" (p. 139). There are six devices, one idea, and four resources. In addition to these recent technology trends, we identified established technology trends. These trends have seemingly become commonplace in our society, such as computers or instructor-led classroom training. Because our focus in this article is on unique devices, ideas, and resources that are relatively novel within the past ten years, we only note these established technologies and methods where there were innovative aspects of the established technology or methods, such as an increasing amount of K-12 schools using laptops for classroom instruction (Brown & Green, 2012). Below we describe the devices, idea, and methods that constitute our framework (see Table 1).

Devices

There are six devices in our emerging framework, including learning management systems (LMS), mobile devices, physical resources, digital resources, mixed reality, and collaborative learning tools. In addition, we identified two established technologies, including both hardware (e.g., videos) and software (e.g., websites). Technology trends involving LMSs included increased use of standard LMS features (such as posting materials and grades) across learning settings, including live classrooms as well as blended and online learning experiences (Brown & Green, 2018a). Further, there was discussion of new LMS tools (e.g., Brown & Green, 2018b) and students' desire for more robust LMS use in their classes (Brown & Green, 2015). Technology trends involving mobile devices are comprised of smartphones, such as new iPhone and Android devices and OS updates (Brown & Green, 2018c), and tablets, such as Apple and Samsung devices (Brown & Green, 2019e), and their use to support learning in the classroom and beyond (Brown & Green, 2014). We distinguished between technology trends that included physical resources and digital resources. Physical resources included Robotics (e.g., Lego robot sets, Brown & Green, 2019b), 3D Printing (e.g., The Smithsonian Institution's initiative to enable cultural and historical learning via 3D printing of artifacts as reported in Johnson et al., 2014) and Makerspaces (e.g., STEM uses highlighted by then President Obama in the Maker Faire event as described in Johnson et al., 2015). Digital resources included digital textbooks (e.g., Pearson moving toward digital offerings, Brown & Green, 2019d), open educational resources (e.g., free education products created by Google and Amazon, Brown & Green, 2016), podcasts (Brown & Green, 2009), and holograms (e.g., PORTL's life-sized holograms, Brown & Green, 2020c).

Table 1

Recent Technology Trends (2009 – 2020)

Type	Category	Technology trend
Devices	Learning Management Systems	Learning Management Systems
	Mobile Devices	Smartphones
		Tablets

Type	Category	Technology trend
	Physical Resources	Robotics
		3D Printing
		Makerspaces
	Digital Resources	Digital Textbooks
		Open-ended Resources
		Podcasts
		Holograms
	Mixed Reality	Gesture-Based Computing
		Virtual Reality
		Augmented Reality
		Wearable Devices
		Geolocation
		Voice-activated Devices
		Internet of Things
	Collaborative Learning Tools	Online Collaboration Tools
		Cloud Collaboration
		Social Media
	Collaborative Learning Tools	Videoconferencing
		Wikis
		Blogs
	Established technology – Hardware	Computers (Desktops and Laptops)
		Video
		MP3 Players
		Adaptive Learning Tools
	Established technology – Software	Printed Content
		Graphics/Images
		Websites
Idea	Artificial Intelligence (AI)	Deep Learning
		Blockchain
		Learning Analytics
Methods	Innovative Strategies	Personalized Learning
		Authentic Learning
		Collaborative Learning
	Online Learning	Online Courses
		eLearning modules
		MOOCS
		Digital Credentialing and Badges
	Mixed Learning Delivery	Flipped Courses
		HyFlex Courses
		Blended Courses
	Gamification	Gamification

Type	Category	Technology trend
	Established Instructional Methods	Formal and Informal Learning General Strategies
		Instructor-led classroom training

Mixed reality included various technology trends that offer learners the ability to interact with content in what Dale (1969) labeled as direct, purposeful experiences, such as, gesture-based computing (e.g., Microsoft Kinect for educational interactions with wildlife, Johnson et al., 2012), virtual reality (e.g., virtual field trips, Brown & Green, 2019c), augmented reality (e.g., experiencing literary characters as described in Brown & Green, 2019c), wearable devices (e.g., collecting data for fitness education, Johnson et al., 2016), geolocation (e.g., Next Exit History's project using geotagged media, Johnson et al., 2009), voice-activated devices (e.g., Brown & Green, 2019c), and Internet of Things (Alexander et al., 2019). Collaborative learning tools also refers to technology trends that potentially enable learners to effectively work together at a distance, such as online collaboration tools (e.g., VoiceThread as described in Brown & Green, 2013), cloud collaboration (e.g., G Suite for Education as described in Brown & Green, 2019a), social media (e.g., Facebook collaborative team projects as described in Brown & Green, 2014), videoconferencing (Brown & Green, 2020), wikis (e.g., Wikiwijs for teachers to exchange content as described in Johnson et al., 2015), and blogs (Brown & Green, 2013).

Idea

Our analysis uncovered one overall idea under the umbrella term, artificial intelligence (AI). AI technology trends include deep learning (e.g., the use of neural networking algorithms to help botanists identify plants logged by smartphone photos taken by community members in the Smart Flower Recognition System, Adams Becker, et al., 2017), blockchain (Brown & Green, 2019a), and learning analytics (e.g., RiPPLE, a platform leveraging student data to provide personalized resource recommendations, Alexander et al., 2019).

Methods

Our developing framework is comprised of four novel instructional methods conceived within the past ten years and a set of established instructional methods (e.g., simulations). Innovative strategies include personalized learning (e.g., Fontan Relational Education model, Johnson et al., 2015), authentic learning (e.g., apprenticeship model in the United Kingdom, Adams Becker et al., 2018) and collaborative learning (e.g., The Global Book eBook series, Johnson et al., 2015). The main technology category, Online learning, includes online courses (e.g., virtual state K-12 schools, Brown & Green, 2017), eLearning modules (e.g., reusable corporate eLearning courses, Brown & Green, 2013), MOOCS (e.g., courses provided by Stanford, Brown & Green, 2014) and digital credentialing and badges (e.g., Mozilla Open Badges, Johnson et al., 2015). Mixed Learning Delivery contains technology trends that combine both face-to-face instructional methods with online instructional methods, such as blended courses (e.g., K-12 schools offering more digital resources in conjunction with classroom learning, Brown & Green, 2018a), flipped courses (Brown & Green, 2017), and HyFlex courses (Brown & Green, 2020b). Finally, Gamification is an innovative method by itself. It can be argued that instructional games are similar to its instructional simulations counterpart and that instructional games can be considered a conventional technology. However, many innovative practices involving a new *Gamification* term have been established in the last ten years involving innovative technology trends, such as use of gaming consoles for therapeutic and educational applications, leveraging digital leaderboards and reward systems for student engagement, targeting specific skills (such as social skills or STEM) via fully gamified online experiences (Johnson et al., 2014), and other similar Gamification technology trends.

Technology Trends' Pedagogical Affordances

Since one of the goals of this position paper is to provide a guide on how to identify and utilize current and emerging LD to effectively address social justice issues with a specific group of learners, we deemed it essential to uncover the affordances of each of the technology trends. Gibson (1966) originally coined the term *affordances* to refer to properties of an entity which demonstrate to the user how to interact with that entity. In instructional design, affordances can be conceptualized as the opportunities that educational media or activities present for interaction or

usage (Norman, 2013). We then provided specific examples of how that affordance of the technology trend may be leveraged to address a social justice issue.

First, we consulted two main sources to establish a useful taxonomy of the different types of learning experiences offered by different technologies: namely, Dale's (1969) Cone of Experience and Molenda and Subramony's (2021) *Elements of Instruction*.

As stated previously, Dale's (1969) Cone of Experience is a seminal framework for understanding what different technological approaches may offer for creating different types of educational experiences, from the enactive to the abstract. We began the development of our new framework by identifying the elements of Dale's Cone that are likely to support Transformative Social and Emotional Learning (SEL) for social justice issues; specifically, we focused on opportunities for enactive activities leading to permanent and rich learning experiences. Dale's Cone notes several types of technologies or trends that might be used (e.g., motion pictures, field trips); however, our focus was on aligning the *new* technology trends we uncovered with the *types* of experiences emphasized in Dale's Cone. Thus, we selected Contrived/Dramatized Experiences (which we combined for simplicity) and Direct, Purposeful Experiences as the broad categories from the Cone.

To supplement our taxonomy of affordances, we then turned to Molenda and Subramony's (2021) book. With their "broad, eclectic view" of learning, Molenda and Subramony define "instructed learning as human learning that is mediated symbolically in planned interactions between facilitators and learners" (p. 95). Molenda and Subramony (2021) offer seven distinct categories of formal instructional events, based on the type of educational opportunity or affordances: Presentation, Demonstration, Discussion, Tutorial, Repetition, and Study (p. 305). During Presentation activities, learners process "new verbal or visual information," during Discussion types of activities, learners perform in "mental processing of new information," and during Study activities learners "contemplate" verbal or visual information at one's own pace (Molenda & Subramony, 2021, p. 305). Molenda and Subramony (2021) noted that Demonstration activities exclusively are dependent on an "instructor's selection of content, gathering of sources and materials, and choice of time and place of delivery" (p. 173). In contrast, Expression activities are exclusively focused on the "learner, who typically exercises nearly complete control over the time, place, and sequence of the activity" (p. 281). Tutorial activities enable learners to gain "deep learning of declarative knowledge" (p. 305) whereas these students can practice their newly acquired skills in Repetition activities. We utilize all of these categories to demonstrate the types of educational events that may be supported by recent technology trends. Thus, the combination of Dale's original categorization of educational experiences and Molenda and Subramony's (2021) categories of instructional events creates a broad set of educational affordances to consider as we think about how instructional activities may be used to create Transformative SEL opportunities.

Finally, since both resources exclusively focused on formal instruction, we added informal learning to our overall list for a more comprehensive focus. It is noted that we did not include Dale's (1969) abstract components (i.e., verbal symbols and visual symbols) of the Cone of Experience nor Molenda and Subramony's (2021) performance/non-instructional interventions when considering the affordances of the technology trends for social justice education. Because Transformational SEL involves deliberate, enactive, and elaborative experiences, we assert that symbolic and performance/non-instructional interventions are unlikely to be effective for this purpose. For example, when teaching about the Black Lives Matter movement, memorizing what B, L, and M stand for is not a transformative learning experience. Similarly, we cannot envision any credible performance/non-instructional interventions for transformative learning about a social justice issue.

Tables 2 and 3 illustrate possible instructional scenarios involving our technology trends, these instructional approaches, and specific social justice issues. Though there are a multitude of social justice issues, we focused on a list of current social justice issues curated from the United Nations (2021) press coverage webpage (https://www.un.org/press/en).

Pedagogical Affordances: Device Trends

Table 2 displays several exemplars on how to utilize our emerging set of technology trends devices with specific instructional affordances with regards to designated social justice issues. For possible presentations to students, a facilitator could create an LMS which houses a data repository on last year's climate change data or could demonstrate the reality of an unfair justice system by creating an experience of interacting with a virtual reality avatar who endured an unfair justice system. An LD can initiate a social media discussion regarding the importance of voting rights, as well as create a VR walkthrough of an established justice system. An LMS can include repetitive quizzes about climate change or an open-ended repository can consist of resources that enables learners to study data on status-based violence issues. A blog can serve as tool for students to express themselves on a variety of social justice issues, as well as a virtual reality instruction can enable one to have a dramatized experience and "walk a mile" in someone's shoes regarding a variety of issues. Finally, podcasts are often used to informally educate about a variety of social justice issues.

Pedagogical Affordances: Ideas and Methods Trends

Table 3 displays several instances on how to utilize our emerging set of technology trends, ideas, and methods with regards to designated social justice issues. For example, an AI-aided presentation on certain diseases can be created to help eradicate these particular diseases or a game can be developed to demonstrate key concerns about economic assistance needs. In addition, a debate game can elicit further discussion about economic disparities. An e-Learning module tutorial can be developed to teach individuals about a particular refugee crisis, and another e-Learning module can enable students to memorize (repetition) key aspects of a particular social justice issue. An AI adaptive textbook can encourage learners to study about various related social justice issues and a gamified VR walkthrough could provide a venue where learners can express their opinions about a social justice issue can take place. A contrived experience involving an AI hologram about a specific disease can take place as well as AI generated recommendations on how to informally learn more about a disease are possibilities in the near future.

Table 2

Recent Technology Trends Devices and Social Justice Issue Instructional Events

Technology Trend/Social Justice Issue	Communication configuration method								
	Presentation	Demonstration	Discussion	Tutorial	Repetition	Study	Expression	Contrived/ Dramatized	Informal
LMS -Climate change	Last year's climate change data	Videos on climate change	Discussion board discussions on climate change issues	Captivate modules on climate change	Drill and practice quizzes on climate change	Access to various databases on climate change	Access to blogs and/or wikis on climate change	Simulations and models related to climate change	
Mobile Devices - Equal Voting Rights	Accessing websites to read facts on voting rights	Video about the importance of movements to gain voting rights	Social media discussions about voting rights	App focused on voting rights history	Online quizzes	Review of online content in course or curated library	Reflecting on key takeaways on social media	Mobile polling simulation that illustrates when everyone's vote is counted	Web materials to learn more about voting rights issues

Technology Trend/Social Justice Issue	Communication configuration method					
Physical Resources - Access to Food, Water, & Sanitation	Presentation of water purification system			Walk-through of 3D printed model showing how to do better city planning	Practice coding robotics to aid with food, water, or sanitation issue	Creating model that demonstrates better resource access

Digital resource - Protection against Status-based Violence	Online news coverage of status-based violence issues	Podcast interviewing people impacted by Status-based violence	Digital textbook elaborating on status-based violence issues	Open educational resources focused on helping students investigate status-based violence issues				Documentary with dramatized interviews addressing violence issues	Podcast on related violence issues
Mixed reality-Fair Justice System	AR museum that includes see/hear content-specific multimedia displays	VR experience speaking to someone with unfair experience with justice system	VR discussion groups enabling moderated conversation on related unfair justice experiences	VR walkthrough of justice system experience	AR and VR game to practice key information on justice system fairness	Database of AR and VR experiences with regards to fair justice issues	Working with team in VR world to establish fair justice practices	VR video experience to "walk a mile" in someone else's shoes	Geolocation to share facts about important justice system events near where students are physically
Collaborative learning - Access to Hiring and Opportunities	Collaboration with goal of gathering materials with regards to hiring and opportunities	Polling to demonstrate how many people have had or witnessed unfair job opportunity experiences	Group discussion on issues related to equal access and hiring	Small-group videoconference with instructor to talk through key aspects of related issue	Group quizzes using cloud collaboration to practice key questions	Video conference study sessions to review content	Contribute to blog about equal access to hiring issues	Groups create skits to show do's and don'ts of fair hiring and promotion practices	Backchannel communication and sharing of personal experiences with job access opportunities

Table 3

Recent Technology Trends Idea/Methods and Social Justice Issue Instructional Events

Technology Trend/Social Justice Issue	Communication configuration method							
	Presentation	Demonstration	Discussion	Tutorial	Repetition	Study	Expression	Cont... Dram...
AI/Efforts to Combat Diseases Worldwide	AI-aided presentations on specific disease	AI model that illustrates potential spread of disease	Use of AI chatbot to simulate "conversations" with "people" who have different diseases	Personalizes learning route based on learner profile generated via AI	AI drill/practice activities on disease facts	AI-adapted textbook customized to learner needs		Conv... with A... powe... holog... unde... key is... abou... disea...
Innovative strategies -	As a personalized learning approach, students begin	Academic professionals	Collaborative learning that generate ideas about how	For deep learning,		Personalized learning via	Problem-based	

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Technology Trend/Social Justice Issue	Communication configuration method							
Equal Access to Educational Opportunities	the course by selecting a case study to view based on their interests	share their own goals and practices for ensuring equal education access	bias may impact educational access		students study one of the core issues in academic access		adaptive flashcards to review key concepts in educational access	learning in which learners define unbiased admissions procedures for a university, using an example dataset
Online learning - Asylum for Refugees	Online resource with main facts about current refugee crises	Online resource (e.g., video) describing a refugee's point of view	Discussion board about rights of refugees	Self-paced eLearning module reinforcing key content	Practice questions included in eLearning module to help students practice remembering core facts of refugee crises	Online access to self-report accounts from refugees	Online assignment such as paper or video submission expressing learner's takeaways and important actions	Onlin prese acco mean throu expe
Gamification - People facing Economic Disadvantage	Choose-your-own adventure style game that introduces key concepts related to economic disadvantage issues	Game with characters that voice concerns related to economic assistance needs	Gamified debate between groups about economic disadvantage issues	Competition to "dig deep" on topics related to economic disadvantage	Quiz game to practice core economic disadvantage concepts	Computer game that allows users to select their topics, etc. with regards to economic disadvantage issues	Gamified self-paced walkthrough of a virtual world with questions to apply knowledge of economic issues	Gam econ
Mixed learning delivery - Healthcare Rights and Dignity	In-class introduction to issues of healthcare inequality issues	Video discussing the steps needed for ensuring appropriate healthcare	Panel discussion with healthcare experts	Digital resources to better understand healthcare issues	Online quiz to test memory on related healthcare issues	Online materials regarding healthcare inequality issues	Presentation on healthcare inequ and potential solutions	

Discussion and Next Steps

This is a first attempt in organizing technology trends over the past eleven years with the goal of determining effective instructional solutions for social justice issues. A next common-sense approach to further evaluate this framework could be to solely concentrate on a particular social justice issue (e.g., climate change) and speculate how each of the technology trends can be effectively implemented for a variety of related learning goals, contextual settings and diverse groups of learners. This proposed approach would illuminate the efficacy and effectiveness of our framework with regards to designing instruction for the designated social justice issue.

Another consideration is that the original Cone of Experience initially constructed by Hoban and colleagues and then, Dale was based on their respective audiovisual education expertise. Similar to how Bloom's taxonomy was developed,

Hoban, Dale, and their respective colleagues speculated on impact of a particular media format (e.g., educational television) on a particular setting (ninth-grade US government class) among themselves. There was no attempt to conduct any research methodologies of any kind (M. Molenda, personal communication December 19, 2020). We speculate that this was because Hoban and Dale constructed their respective frameworks *before* the advent of a qualitative research methodology. Besides our own constant-comparative process, we anticipate other research methods such as West and colleagues' pseudo-bibliometrics studies (West et al., 2018), can be applied to construct a common framework of technology trends with the intent of educating students about social justice issues. This possible study only would strengthen and complimented our own efforts described in this article.

In addition to concentrating on a specific social justice issue and considering additional research methodologies in solidifying this proposed framework, some additional thought needs to take place in what shape or figure our framework should be. Our initial starting point was a cone or the Cone of experience. Based on Hoban and colleagues work, Dale conceived of, speculated and then formalized the cone based on Bruner (1966) concrete-abstract continuum. What shape would be best suited to illustrate our emergent framework particularly with regards to social justice issues? To properly consider this revision, one needs to contemplate the interrelationship between technology trends and social justice issues. Again, as was stated previously, it is no doubt that an abstract instructional event about a social justice issue is overtly ineffective. There must be a direct connection with learners' affective domain and the specific social justice issue. In addition to adopting culturally sensitive techniques, such as Peters and Giacumo's (2020) ethical and responsible cross-cultural interviewing methods, a comprehensive investigation on the new area of Social Emotional Learning and its relationship on our technology trends framework should take place in order to provide more guidance on how to effectively educate learners about social justice issues.

Conclusion

This position paper is an attempt to provide a provisional structure with regards to current and emerging technology trends for the LD professional. Along with Molenda and Subramony (2021)'s communication configurations and selected components of Dale's (1969) Cone of Experience, an LD professional can use our framework to effectively connect these current technological trends to educating learners about an assortment of social justice issues. If this scenario comes to fruition, we will be pleased that our framework and efforts are a positive implementation of our respective LD expertise.

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Equity Unbound as Critical Intercultural Praxis

Mia Zamora, Maha Bali, Parisa Mehran, & Catherine Cronin

Open   Equity   Care   Intercultural Learning   Critical Curriculum   Networked Learning   Connected Learning

This article traces the emergence of Equity Unbound, originally founded as "equity-focused, open, connected, intercultural learning curriculum" (Equity Unbound, n.d.) and designed with a critical curriculum approach. We outline how our design and praxis centers on social justice and how our activities and purpose have continued to evolve to respond, with care, to the needs of our networks. We then offer a critical autoethnographic account from an educator who started on the margins of Equity Unbound and later became a key co-facilitator.

Introduction

This article traces the emergence of Equity Unbound, originally founded as "equity-focused, open, connected, intercultural learning curriculum" (Equity Unbound, n.d.), and designed with a critical curriculum approach. We outline how our design and praxis centers social justice and how our activities and purpose have continued to evolve to respond, with care, to the needs of our networks. We then offer a critical autoethnographic account from an educator who started on the margins of Equity Unbound and later became a key co-facilitator.

"Equity Unbound" was conceptualized and initiated in 2018 out of the aspirations of three educators: Mia Zamora (Kean University, New Jersey, USA), Catherine Cronin (then at the National University of Ireland, Galway) and Maha Bali (American University Cairo [AUC], Egypt). The authors collaboratively imagined an equity-focused, open, connected, intercultural learning curriculum for teaching digital literacies to educators and co-learners in diverse educational contexts, with an emphasis on higher ed. We had been critically engaging and leveraging the open web in our professional development and teaching, and noticed most intercultural learning experiences did not take advantage of the open web and potential for participatory and connected learning. We also noticed equity was rarely tackled in such learning experiences and attempts at promoting intercultural learning *without* centering social justice have been problematic, often reproducing power differences and injustices.

In response to these observations and after clearly identifying a need to center social justice when pursuing intercultural learning on the open web, we created Equity Unbound driven by a belief that "the only way to make borders

meaningless is to keep insisting on crossing them" (Mounzer, 2016). As a diverse group of educators from different countries and higher education systems, two initial key questions drove our collaboration and the design of Equity Unbound:

1. How can we minimize the ways that our institutions and pedagogies serve to exacerbate existing inequalities?
2. How can we work together to create and sustain equitable and just learning environments for all?

Equity Unbound recognizes the important role intercultural education plays in supporting justice, as noted by Palaiologou and Gorski (2017), when it is "implemented in ways that respond directly to the most pressing contemporary forms of exploitation – when they respond to the newest forms of exclusion, disenfranchisement, and marginalisation" (p. 353).

The work of open, participatory, equitable learning and teaching is personal and requires continual reflection on our own practice, including excavating assumptions not serving the needs of all students and the greater public good. In Equity Unbound, we adopted a critical approach to openness – seeking to move our collective learning and teaching towards equity and towards epistemic justice. Our goal was to avoid centering our curriculum on particular content and aim at centering it around particular values, recommending content and activities, and creating a space where our students and other interested learners/educators could engage and contribute. By centering these goals, the curriculum would be emergent. Cronin (2019) states:

> The work of critical open educators . . . is individual, collective, and multi-layered: decentering Global North epistemologies; furthering personal and institutional understanding of intersectional inequality; challenging traditional power relations, within and beyond classrooms and institutions; connecting with/via formal and informal learning spaces (digital and physical); recognizing that resistance to openness is a personal, and possibly radical, choice; and ongoing self-reflection (p. 19).

We know equity cannot be envisioned as a one-size-fits-all destination. The "unbound" in the project title itself alludes to limitations and constraints when aspiring to an equitable world, and also to limitations of achieving all we aspire to within the confines and hierarchies of formal institutions.

Values-Based Design: Equity Unbound as Critical Curriculum

A critical approach to curriculum must necessarily resist the traditional higher education approaches of designing curricula with particular measurable learning outcomes in mind or having preset readings included on the syllabus. Both of these approaches raise questions over the hidden values behind any choices of outcomes and content, which cultures are represented and privileged, and who has the power and authority to decide which outcomes and content are valuable (Cornbleth, 1990; Grundy, 1987). They also beg the question of how to design courses with uniform outcomes regardless of differences in students' contexts and starting points, and how to include content relevant to students' cultures before meeting and knowing them. How would a teacher be able to remain sensitive to the interests and needs of students? One of the answers is to conceive of learning experiences as "curriculum as process". This entails the teacher and students enacting the curriculum while interacting together (Stenhouse, 1975).

Our design went beyond "curriculum as process" and became a critical curriculum, or "curriculum as praxis", one which centers liberation and questions social injustice and hegemonic worldviews (Grundy, 1987). Our critical curriculum also centered context, recognizing pedagogical processes, not just content, promote values exacerbating or redressing injustice (Cornbleth, 1990). Although Equity Unbound had some set topics and suggested content as a starting point, topics were intentionally chosen to promote social justice and include diverse viewpoints of authors/speakers of color from around the globe. What was more important were the processes and dialogue occurring within our classrooms around these topics, and creating open, connected learning experiences our students and other educators around the world could participate in. Critical digital pedagogy, after all, focuses on the potential of open practices to create dialogue, to deconstruct the teacher-student binary, to bring disparate learning spaces together, and to function as a form of resistance to inequitable power relations within and outside of educational institutions (Stommel, 2014).

In our work, we wished to avoid what McMillan Cottom (2015) called "expand[ing] access without furthering justice", and instead adopted Fraser's (2005) three dimensions of social justice: economic, cultural, and political. The Equity Unbound curriculum addressed each of these dimensions:

Economic

All of the content housed on Equity Unbound is freely available and the curriculum itself is openly available on a public website; therefore, anyone in the world with an internet connection can access the basic content. Where possible, multimedia content requiring high bandwidth, including live recorded sessions, was available as a recording for those who could not participate live.

Cultural

We intentionally chose content produced by international and minority authors/speakers. For example, among our first prominent readings/videos, you will find Chimamanda Ngozi Adichie, a Nigerian author, speaking about identity and the danger of a single story; Binna Kandola, an Asian-British psychologist, speaking about unconscious bias; and Lina Mounzer, a Lebanese author, writing about the lived experiences of Syrian female refugees and the violence of translation in *War in Translation*. When conducting live studio visits, we intentionally ensured the majority of invited speakers were women, people of color, and/or from the Global South.

Political

The facilitators of the first round of Equity Unbound are three women from diverse backgrounds. We designed with bell hooks' belief that "radical pedagogy must insist that everyone's presence is acknowledged" (hooks, 1994). In practice, this means that "everyone influences the classroom dynamic, that everyone contributes" (hooks, 1994). It also means extending an "always open" invitation to share and adapt materials while growing the network with new participants (i.e., educators and learners engaged in formal, informal and nonformal education). The margins were the mainstream in Equity Unbound. Most contributors were those not typically foregrounded in curricula (i.e., women, people of color, and/or from the Global South). However, we recognize participants had to have a degree of digital literacy and familiarity with the facilitators in order to take that step to engage, unless they were our own students whom we explicitly encouraged to contribute.

Values-Based Practice/Praxis

Our practice had an additional political action: the ordering of the initial content. We intentionally started with issues of identity, empathy, bias and equity, before moving on to discuss social injustice in algorithms, fake news, digital colonialism, online privacy, safety, security and wellbeing, and how these differ across contexts. In doing so, we sought to lay a foundation for the explicit values of our curriculum. We intentionally created asynchronous, text-based activities (e.g. blogging, Twitter activities and slow chats, Hypothes.is annotation) to lower barriers for participation. Mindful of diverse time differences for global participants, linguistic diversity of participants, and even accessibility issues like consistent wi-fi access, we attempted to vary our activities and offerings, and to build these concerns into our intentional planning. We created a Twitter account (@UnboundEq) and also a hashtag (#UnboundEq) so all activities were visibly open across networks. We also intentionally used a mix of video, audio, and text-based content in order to make material accessible to a wider range of audiences, some of whom may not have English as their first language. In addition, we developed network activities and learning materials with an eye for revision and remix, intentionally and explicitly keeping open to thoughtful network-generated critique and new insights.

An early Equity Unbound activity is a Twitter Scavenger Hunt, designed to initiate community, sharing, and networked learning by inviting participants to share images using the #UnboundEq hashtag on Twitter. The first instance of this activity in 2018 revealed an unintentional "blind spot": one participant critiqued the exercise as having a component that was inaccessible to people with visual disabilities. This resulted in an important learning experience for everyone, as the network collectively explored how to use Twitter's alt-text option when including images. In addition, Equity Unbound

participants crowdsourced an open letter to Twitter to make the alt-text option the default rather than an option. This is an example of emergence and how participants can drive the agenda of a course.

Online Studio Visits form another important strand of Equity Unbound practice. Studio Visits are essentially open video conversations (i.e., Google hangouts or Zoom sessions) planned within the Equity Unbound curriculum which include #UnboundEq facilitators, invited scholars, and students from across the globe. These sessions aim to model intercultural and transnational collegiality. While these conversational sessions are designed around learning themes such as "Empathy & Bias" or "Equity in Education", Studio Visits never contain a script or planned interview questions. Rather, these conversations are intuitive and unfold as dynamic dialogue in order to embody and model active thinking partnerships. We grapple with challenging questions and of-the-moment concerns. Together, the authors and participants have recalled critical or formative memories in our lives, explored our own blind spots or (mis)understandings, and connected personal experiences with our shared purpose of redressing injustice. In other words, as active co-learners we practice and promote self-reflection, trust, and care through both lived experience and a lens of criticality. To engage in dialogue is one of the simplest ways we can begin as teachers, scholars, and critical thinkers to cross boundaries that may or may not be erected by race, gender, class, professional standing, and a host of other differences (hooks, 1994, p. 130). A less visible but equally valuable community existed in an ongoing private Twitter Direct Message group consisting initially of the three founding facilitators but eventually growing to include several other educators from Canada, Italy, Japan, and the United States.

Every topic area in Equity Unbound has a "contribute" section inviting anyone, student or educator, to contribute to course content or activities, and some of these suggestions were incorporated immediately, others the following semester. One early Studio Visit guest and active participant, Parisa Mehran (the author of the narrative section of this paper), suggested many videos later becoming part of the curriculum, and she became a co-facilitator of future iterations of Equity Unbound.

Another example was an AUC student who suggested we move beyond talking about bias and empathy and delve into the more systemic issue of othering. That semester, the student suggested possible videos and readings, and since then, a new article was added to the list for the topic of bias. The article is one that students annotate or blog about across the globe. In addition, Maha Bali designed a specific assignment called "contribute" and students added material or activities they thought could be used to fulfill the overall goals of the course. As a result, a student suggested "NASA girl" as an example of fake news perpetuated by an Egyptian AUC student, and this reference became a content staple in future semesters.

Beyond the first level of engagement with course content, the use of Hypothes.is annotation has meant that both learners and educators can engage with each other's reflections on the content, such that this interaction and social construction of knowledge has been crucial. Moreover, in a section where participants could play games to promote empathy, AUC students developed their own games about causes they felt passionate about and received feedback on early drafts from anyone in the open community. The final versions of those games were then used in future iterations as sample games for other students to try before developing their own.

Equity Unbound as Emergent Critical Space and the Activation of Care

As facilitators of Equity Unbound, we have considered the overall value (and limitations) of "care" in the continuing development of this intercultural learning network. We draw on Fisher and Tronto's (1990) conception of care, where the ultimate goal of caring dispositions, activities, and practices is to bring about well-being; to have an impact on our world that enables us "to live . . . as well as possible" (p. 40). Partway through Equity Unbound's first run, we realized the curriculum was not only serving the facilitators' students, but also helping other educators. Educators learned to not just use the curriculum, but to form community around social justice issues in digital spaces. Noddings (2012) suggests in unequal relationships such as parent, nurse, or teacher "carers in this position need the support of a caring community to sustain them" (p. 54). We continue to ask ourselves: can "care" be an explicit tool for social transformation when it is rooted in actual practices and mechanisms aimed towards a lasting social reorganization? ("Pedagogy of care", 2019).

Emergence in Practice

This critical question of care took on new urgency in Spring 2020. Because of the emergent nature of Equity Unbound, when the Covid-19 crisis hit, we were able to also pivot our focus to urgent issues by crowdsourcing a global conversation on "Continuity and Care During Coronavirus". The conversations included a Google document and several open Studio Visits (Equity Unbound, 2020). Some of our resulting discussions were recorded and some were not in order to promote comfort among participants when sharing information about themselves on sensitive topics such as privacy and surveillance. These recording decisions were usually made in collaboration with the studio visit speaker and with consent from students. Sometimes students requested the session be recorded in case their internet was unstable, but that the recording only be shared among participants and not on YouTube.

An ongoing Twitter direct message "Continuity with Care" conversation became a lifeline for 27 educators throughout the crisis. This group's direct message was never intended to be an ongoing community space. It was created for the purpose of quickly inviting people to a studio visit. However, it emerged as a critical space for mutual support. As we all have struggled to cope, the politics of care has taken center stage. Equity Unbound has helped many people collaboratively think about the urgency of care in education and the strategies at multiple levels care requires. We continuously ask: in what ways are our scholarly practices also activist practices? in what ways are we opening up the academy? And, how can we take concrete steps to listen, learn, and collaborate with those who have previously been unheard/unauthorized? Equity Unbound has mobilized our critical curricular design knowledge and our equity-oriented praxis to respond to the moment via our existing and growing networks. We trust in collective intelligence and valuing different types of knowledge, while avoiding distinctions between experts and non-experts as we continue to listen to one another's ideas.

Moreover, when the murder of George Floyd sparked a resurgence of #BlackLivesMatter --with related calls to redress injustices in academia via the #ShutDownAcademia and #ShutDownSTEM movements-- Equity Unbound hosted a panel conversation entitled "Inclusive Citation, Inclusive Academy?" (Bali et al., 2020) held in June 2020. Invited scholars of color spoke about systemic injustice in academia and ways to enact anti-racist and decolonial academic practices. Participants and panelists agreed to move forward with an online workshop to focus on concrete action plans for proposal to individuals, institutions, and policy makers. These events eventually led to the establishment of the "Socially Just Academia" project later in the year. This project is the embodiment of a space for praxis by: taking action based on collective reflection and consciousness-raising around systemic oppression. In other words, "Inclusive Citation, Inclusive Academy?" (Bali et al., 2020) activities and the resulting corrective action workshops are an extension of our activation of care.

Intentionally Equitable Hospitality and Online Community Building

The latest Equity Unbound project has emerged as a response to the continuation of online or at least hybrid teaching in many countries across the world for the latter half of 2020 and early 2021. We realized many educators unfamiliar with online education were struggling to build community online. In response, Equity Unbound collaborated with the global network for higher education, OneHE, to create a website that curates resources for online community building. The website offers demos and materials educators replicate or adapt in their own settings. This work builds on our previous experience with Intentionally Equitable Hospitality (IEH) derived from our work with Virtually Connecting (Bali et al., 2019b). IEH is an approach for ensuring hybrid video conversations pay close attention to power dynamics in order to ensure spaces are welcoming and hospitable to the most marginalized of participants, not just in terms of intention and design, but in terms of the embodied and enacted experience.

Educators from around the globe have contributed activities for conducting online introductions, warm-up activities, ideas for setting the tone in classes, structures for ongoing engagement, and more. Since equity is at the center of our practice, we also offered adaptations for each activity (e.g., for synchronous and asynchronous options) video-based and text-based options, and some considerations for safety when doing activities. The list of demos and resources continues to grow and is open to contributions and critiques (See https://onehe.org/equity-unbound for more information). Again, the majority of our contributors were women and from a variety of countries including Egypt,

Lebanon, Kenya, US, UK, Canada, and Australia. We launched the project in August 2020 just before the Northern hemisphere new semester, with lead curators Maha Bali, Mia Zamora, and Autumm Caines. Since the launch, the Online Community Building resources landing page has had 25,000 unique pageviews, the individual resource/activity pages have had a collective total of just under 33,000 unique pageviews, and traffic has come from 163 countries in total. Many educators and faculty developers tweeted with gratitude for these resources (Blum, 2021; Cohn, 2020).

Along with our activation of care as a strategy, it is equally important to recognize Equity Unbound is, at the core, aspirational. We continually seek to move toward our shared value of equity, knowing that this work is *always in process*. For example, when we do Studio Visits including students and educators from around the world, we noticed if we do not explicitly suggest the importance of IEH, educators may not be considerate of making space for all students to speak equitably in breakout room activities. Likewise, if we do not remind others to prioritize the voices of the most marginal, our processes may fail to embody the equity and care intended.

Our praxis is about continually and collectively finding new ways to dismantle boundaries of power, but we also know this work is risky, and for some, more than others, is born of small brave moves from the margins. In the third section of this paper, Parisa Mehran (initially an invited Studio Visit guest speaker and later a co-facilitator for Equity Unbound) uses an autoethnographic account to make visible this truth. Autoethnography is an approach that seeks to describe and analyze personal experience in order to understand cultural experience (Ellis et al., 2011). In keeping with the foundational values of Equity Unbound, this methodological approach challenges canonical ways of producing knowledge and representing others. By employing the tenets of autoethnographic narrative, we foreground our process and see it as product. By choosing this methodology to close, we acknowledge this research as a political, socially-just, and socially-conscious act.

The Praxis of Equity Unbound: An Autoethnographic Narrative by Parisa Mehran

In *Pedagogy of the Oppressed*, Paulo Freire (1970) defines praxis as "reflection and action directed at the structures to be transformed" (p. 120). One such structure which is in need of urgent transformation is white supremacy in English Language Teaching (ELT). I am an Iranian English instructor based in Japan, and my existence in academia is constantly being questioned because being white or how close you are to being white is among the core qualifications in my 'profession'. My lived experiences as a marginalized professional in ELT, alongside my efforts to radically transfer ELT's inequitable structures (Mehran, 2020a), have led to my isolation. For a long time it felt like I was drowning in the sea of whiteness - ironically in the land of People of Color. While this isolation first sounded like social exclusion and marginalization, I gradually came to realize this is actually mindful isolation (i.e., disconnecting myself from spaces which are not meant for the 'outsiders'), and I found myself in spaces, in Dr. Thema's (2020) words, "where I am seen and heard, where I am safe and celebrated, and where I can breathe". One such space is Equity Unbound.

So far, I have experienced five visa rejections. You can read about my UK visa rejections at the blogpost: "Denied Yet Present at EUROCALL 2017: A Memoir" (Mehran, 2017), and my recent Canadian visa rejections at this blogpost: "And this is me a lonely woman" (Mehran, 2020a). Equity Unbound's tagline, "Making borders meaningless" strikes a chord with me.

I know Equity Unbound through Maha Bali, and our Sisterhood which is a political term, different from friendship, meaning we are in solidarity with each other. Our sisterhood was shaped when Maha, together with her team, connected me to EUROCALL 2017 via Virtually Connecting (See www.virtuallyconnecting.org) and made visa rejections meaningless. When Maha introduced Equity Unbound on Twitter, I knew that praxis would be at the heart of this initiative, and I decided to get involved. Being connected with equity-minded educators, who see me beyond the stereotypes and do not 'include' me nor 'empower' me, but work with me toward liberation and equity, not for all, but for those who are "farthest from justice" (Okuno, 2019), is all I needed to feel associated with a community. Equity Unbound has put me in the cycle of theory, action, and critical self-reflection in which I try to actualize my equity-oriented teaching philosophy in my classrooms, especially by answering this question: how does my identity shape the way I teach?

Joining Equity Unbound, in reflecting on Chimamanda Ngozi Adichie's powerful TED talk, *The Danger of a Single Story*, started a conversation about empathy, bias, authenticity, and power in my classes. I shared my stories of othering with my students. I asked them: what is your single story of my country? I asked them: what is my single story of your country?

"How are stories related to authenticity? And to power?" Together with my students, I started reflecting on this question raised by Equity Unbound about Adichie's TED Talk. Adopting an autoethnography approach, which is the writing (graphy) of one's personal story (auto) in relation to cultural, political, and social analyses (ethno), I answered these questions in addition to these emerging questions: Am I authentic in my own classrooms? And, am I powerful in my own classrooms?

My Journey to My Authentic and Powerful Self

Authenticity is the "subjective experience of alignment between one's internal experiences and external expressions" (Roberts et al., 2009, p. 151). Marginalized and socially devalued groups often struggle to create authentic identities as they "are generally characterized within society as possessing unfavorable characteristics, and that are often stigmatized by negative stereotypes and low relative status in social hierarchies" (Roberts & Creary, 2012, p. 73). I am an Iranian woman who used to wear *roosari* (a type of Iranian head-covering), and now I wear a hat after experiencing racial microaggressions and going through an identity crisis after being called a terrorist, a life-changing event that has profoundly changed my being. This incident made me acutely aware of the inequities imposed by the intersection of nationality, race, gender, physical appearance, skin color, and religion. A story that I keep sharing in spaces where I am not silenced and I can be my true self, which to me means wearing my gol o bolbol roosari (please refer to Equity Unbound "Studio Visit #1: Empathy & Bias") (Zamora, 2018). And, there are few such spaces out there for me. I still prefer to wear a hat in my classes especially during the first session to protect myself from the shock of the existence of an English teacher who is not a "native speaker", which is a code for white male from a so-called English-speaking country with the 'right' passport. However, I create teaching moments for myself where I share my stories and during those moments, my *roosari* finds her way into my classes. Equity Unbound activities have helped me construct such moments.

On reflection, I realized I have had this question in my mind for a long time: "Is my Iranianness a barrier for me?" Until recently, I had no clear answer for this question rooted in my internalized racism, and a powerful tweet (DrawnToIntellect, 2020) made me confident that the barrier is white supremacy. The systems of power are the barriers, and the power of storytelling can dismantle oppressive power systems.

Through another Equity Unbound activity, "Linguistic Landscapes" (Zamora, 2019) recommended by Italian-British co-facilitator and fellow language teacher, Francesca Helm, my students and I could co-create spaces in my classrooms to teach about critical multilingualism. While my mother tongue is considered as a deficit in ELT in which 'native' speakerism is prevalent, I, as a marginalized professional, have some limited power to transgress one of the dominant hegemonies in my 'profession' within my classroom.

While reflecting on writing this piece, I realized that my journey to my authentic and powerful self is bounded and comprises continuous revolutionary effort to be fully achieved. The notion of bounded authenticity is a protective one which provides me with sociopsychological safety to construct my authenticity within oppressive systems and identify strategies and initiatives for transformation. Also, the concept of bounded power gives me opportunities to act and go beyond the binary of powerless and powerful. Transgressing within my limits and taking action despite being bounded is what Equity Unbound let me experience as a marginalized pedagogue, as those who teach at the margin also have a praxis that is relegated to the margin, and:

> I was not speaking of a marginality one wishes to lose – to give up or surrender as part of moving into the center — but rather of a site one stays in, clings to even, because it nourishes one's capacity to resist. It offers to one the possibility of radical perspective from which to see and create, to imagine alternatives, new worlds (hooks, 1990, p. 149-150).

Finally, my involvement in Equity Unbound has led to an emic understanding of my authentic identity construction within its limits especially by inculcating a sense of community in me despite living at the margin and being constantly perceived as an 'outsider' — a *kharejee*. I would like to conclude my section with the following poem, which I shared as a tweet with the Equity Unbound hashtag, by Sholeh Wolpé (2008) an Iranian American poet, writer, and literary translator with those who do not belong anywhere and live at the threshold of belonging:

The Outsider

I know what it's like to be an outsider, a *kharejee.*

I know how English sounds

when every word is only music.

I know how it feels not

to be an American, an English, a French.

Call them

    —*Amrikayee, Ingleesee, Faransavi,*

see them

    see me as alien, immigrant, *Iranee.*

But I've been here so long.

they may call me American,

    with an American husband

    and American children . . .

But mark this—I do not belong anywhere.

I have an accent in every language I speak.

From *Rooftops of Tehran* (p. 82).

Conclusion

As powerfully evoked in autoethnographic narrative, a critical element of the Equity Unbound approach has been the importance of making ourselves vulnerable as educators. In the process of enacting these learning experiences, we realized this overall curricular endeavor became a supportive community enhancing our own wellbeing as educators and enabling us to be better teachers and better human beings. As hooks (1994) emphasizes:

> To educate as the practice of freedom . . . comes easiest to those of us who also believe that our work is not merely to share information but to share in the intellectual and spiritual growth of our students. To teach in a manner that respects and cares for the souls of our students is essential if we are to provide the necessary conditions where learning can most deeply and intimately begin (p. 13).

Thich Nhat Hanh (cited in hooks, 1994) suggests that holistic education (also called "engaged pedagogy" by hooks) goes beyond most notions of critical pedagogy and involves an element of wellbeing where teachers "must be actively committed to a process of self-actualization that promotes their own well-being if they are to teach in a manner that empowers students" (hooks, 1994, Kindle location 286). We noticed as the #UnboundEeq curriculum grew and evolved,

we all looked to Equity Unbound as a kind of "lifeline" of support and strength as we moved forward with our work within our own local, institutional, or societal contexts. We received feedback attesting to the importance of this support from participants in Equity Unbound events, such as studio visits (Walji, 2018), as well as from participants in the wider network, whom we do not know, but who engaged with #UnboundEq via Twitter (Blum, 2021; Cohn, 2020; Leek, 2020).

It is rare anyone talks about professors and scholars in university settings as healers (Thich Nhat Hanh, 1994), and "even more rare to hear anyone suggest that teachers have any responsibility to be self-actualized individuals" (hooks, 1994, p. 15). As we have practiced self-actualized engagement, we have realized the significance of making ourselves vulnerable as a *caring* act of learning empowerment, and we have also discovered the design of social justice work is both situational and embodied in context. Herein lies the paradox of our vulnerable yet hopeful work. Perhaps the "unbound" in our network's founding title alludes to limitations and constraints when aspiring to an equitable world. Simultaneously, "unbound" points to the limitless possibilities residing in our public scholarship as open self-reflexive practice. Along the way, our iterative and emergent learning design for social justice has loosened problematic binds that come from institutional structures, from institutional timelines, from institutional or academic standards of "what is allowed", and even from "what counts as knowledge".

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Realizing Equity and Inclusion Goals in the Design of MOOCs

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Design   Equity   Higher Education   Inclusion   MOOC

Our research explores coherence between diversity, equity, and inclusion goals that faculty articulate in advance of the design process and their enactment within massive open online courses (MOOCs). The purpose of the study is to gain an understanding of the types of goals identified by faculty within course design proposals and how those goals are instantiated in corresponding course designs when working with design teams. Our team analyzed 11 single MOOC and MOOC series proposals to characterize the design goals stated. Following the proposal analysis, we analyzed 32 corresponding courses to identify instances in which stated goals related to diversity, equity, and inclusion were realized. Our analysis revealed patterns between proposed goal types and the ways in which goals manifest in courses related to the way in which content or learning processes were central to the design. We intend to use the results to inform the development of processes to engage in a systematic and purposeful approach for the realization of equitable and inclusive design goals in MOOCs.

Introduction

Words like disruptive and revolutionary have often been used to describe the potential impact of massive, open, online courses (MOOCs) on access to elite universities and their faculty (Carver & Harrison, 2013; Toven et al., 2014). Yet the promise of equitable and inclusive access for a global audience of learners has not always been realized, and some scholars have argued that MOOCs may even perpetuate educational disparities as they do not spread benefits equitably. For example, learners from developing countries may be particularly disadvantaged and even experience social identity threat when courses do not adequately attend to their learning traditions, contexts, and needs (Kizilcec et al., 2017). Inequitable course designs include a narrow focus on Western epistemological perspectives and the prevalence of unidirectional, or pedagogies of transmission, utilized in courses (Rhoads et al., 2013). Designing for diversity, equity, and inclusion (DEI) in MOOCs, therefore, presents a variety of challenges, but because of the potential reach of MOOCs opportunities exist for advancing innovative pedagogies and content that take into account learners from a variety of global contexts (Ebben & Murphy, 2014). Knowing this, MOOC faculty may have good intentions for

advancing DEI goals in their course designs. Yet more research is needed to understand their specific aspirations and the extent to which they are successful in realizing these goals with the help of design teams.

Our research explores the coherence between DEI goals that faculty articulate in advance of the design process and their enactment within the resulting MOOCs. Our study details work within an instructional services unit specializing in the design, development, and production of open online courses at a Research I university in the midwest of the United States. The purpose of the study is to gain an understanding of the types of DEI goals identified by faculty and how those goals are instantiated in corresponding course designs. Additionally, we intend to use the results to inform the development of processes (e.g., pre-proposal consultations assisting faculty in the development of actionable DEI design goals, embedding DEI reflection points during each phase of design, seeking qualitative feedback from colleagues or potential learners pre-launch, and sourcing qualitative learner feedback related equity and inclusion post-launch) to engage in a systematic and purposeful approach for the realization of equitable and inclusive design goals in MOOCs.

We use the following research questions to guide our study:

1. What goals for DEI do faculty identify in their MOOC project proposals?
2. In what ways are stated faculty DEI goals manifest in the final design of their MOOC?

Conceptual Framework

As designers of learning experiences, we see design as a potential avenue to mitigate issues related to equity and inclusion in open education. We draw on theories of intercultural and transformative learning and a framework for diversity scholarship as a conceptual framework to guide data analysis and the synthesis of results.

Intercultural Education and Transformative Learning Theory

When designing online learning experiences, faculty and design teams should consider the social identities of learners, the situatedness of learners and the curriculum, and pedagogical strategies that promote respectful, intercultural dialogue between learners. Theories of intercultural education and transformative learning have the potential to serve as frameworks for faculty and design teams to create more equitable and inclusive online courses that center the needs of diverse learners and advance the democratization of online education in a global society.

Intercultural education emphasizes "dialogue, social inclusion, interaction, and exchange through . . . empathy, flexibility, and curiosity" (Portera, 2008, p. 399). Intercultural education creates the possibility for personal and social growth through interacting with "individual[s]of different cultural origin[s]" (Portera, 2008, p. 485). Intercultural education lies between two epistemological poles in which "differences and similarities are taken into consideration, brought into contact, and bring about interaction" (Camilleri, 1985 as cited in Portera, 2008, p. 486). Technology has increased opportunities for intercultural communication within online learning spaces and as such, intercultural education may "represent the most appropriate response to the challenges of globalization and complexity," as educators and institutions continue to strive to demonstrate their commitment to diversity, equity, and inclusion within online learning experiences (Portera, 2008, p. 488). Online learning experiences that draw on existing knowledge of learning in different socio-cultural contexts may foster intercultural competence and communication and create space for curricular and pedagogical flexibility. In turn, these designs could increase equity and inclusion within learning environments and augment learning for those across the globe (Gunawardena, 2014). Online intercultural education requires learners to engage in discursive communication with others, which requires critical introspection and the capacity to simultaneously embrace the similarities and differences of others.

The tenets of transformative learning theory offer a framework for carrying out online intercultural education as the central premise of the theory is the transformation of frames of reference through "critical reflection on the assumptions upon which our interpretations, beliefs, and . . . points of view are based" (Mezirow, 1997, p. 7). Learning experiences that foster transformative learning require:

- Autonomous thinking
- Imaginative problem-solving
- Self-direction
- Group deliberation
- Learner-centered discourse
- Content that reflects the lives and experiences of learners (Mezirow, 1997, p. 10)

We use intercultural education and transformative learning theories as lenses in the subsequent literature review focusing on the design and implementation of MOOCs. We explore three main themes in the review: 1) the democratization of online education, 2) the motivations of faculty engaging in equitable and inclusive design, and 3) the impact of equitable and inclusive design on learning.

Democratizing Online Education

The democratization of online education extends beyond open enrollment in MOOCs. According to Rhoads et al. (2013), democratizing open online education requires thinking beyond expanded access to educational resources and must include divergent epistemological perspectives and engage non-dominant "social actors, institutions, and nations" (p. 106). Relatedly, Chen et al. (2020) investigated what they refer to as a "third way" of course design that reimagines the epistemological perspectives of a large Western-centered MOOC for a local, non-Western context through a process the authors refer to as an "ecological circle for MOOC development" (p. 20). More specifically, the *Learning How to Learn* MOOC was collaboratively redeveloped by a cross-national team for a Chinese context and renamed *The Tao of Learning*. The authors indicated that during the redesign of the course, culturally-specific content and analogies within the course were updated to be relevant to learners in China.

Rhoads et al. (2013) call for the use of liberating and democratic pedagogies in open online education, and may also include critical pedagogical perspectives drawing on Freire's (2014) work. Critical pedagogies are liberating in the sense that learners are encouraged to critically reflect on content and the context in which they are learning as "there is no such thing as a neutral education" (Shaull, 2014, p. 34). Morris et al. (2017) expand the notion of critical pedagogy to the digital space—specifically to MOOCs—explaining that critical digital pedagogy revolves around collaborative communities that are open to multiple voices and international perspectives that communicate beyond social, cultural, and political boundaries outside of traditional higher education institutions.

In their study, Dennen and Bong (2018) found that courses encouraging cross-cultural dialogue between learners with divergent national cultures (e.g., individualistic and collectivist) tend to make those in the non-dominant culture susceptible to feelings of otherness. To reduce feelings of otherness, flexible and dynamic course design and facilitation recognize and respect the cultures of learners, support learners so they feel safe to experiment with those who are different from them, and promote dialogue as a way to help learners understand each others' lived experiences (Dennen & Bong, 2018; Shahini et al., 2019). Relatedly, Mittlemier et al. (2018) reported that learners' tended to engage in collaboration when content was directly related to their personal backgrounds. Mittlemier et al. suggest that when incorporating collaboration in online courses, educators should consider flexible grouping strategies and encourage learners to share their experiences as sources of content for other learners.

Faculty Considerations When Designing for DEI in Online Courses

It is important to consider faculty motivations for creating MOOCs in general to understand the reasons they may choose (or not choose) to pursue DEI goals. Scholars also present a view of MOOC instructors who desire to reach a wide audience of global learners. Freitas and Paredes (2018) explored faculty motivations driving MOOC development and found that faculty valued the opportunity to widely share specific knowledge to a general audience. Kolowich (2013) asserted that MOOC instructors most frequently cite the desire to reach a worldwide audience of learners and a goal of increasing access to instructional materials. Similarly, Hew and Chung (2014) noted that faculty may be interested in engaging in MOOC design and production processes because they are motivated by a sense of altruism, with the goal of reaching learners who might otherwise not have access to educational experiences. Kleinman (2018) described faculty who were interested in utilizing MOOCs as a means of sharing widely on a topic they are passionate

about and feel is of great societal importance, thus increasing learners' awareness on critical topics. Although these scholars do not focus on faculty intentions concerning DEI, these studies do shed light on faculty motivations for expanding reach and access, which is a related goal.

Beyond reaching global audiences of learners, one MOOC instructor demonstrated an ambition to incorporate the voice of the learner into the instructional materials through the creation of locationally-specific data science problems (Quintana et al., 2018). In another study, a group of instructors indicated a desire to meet the unique needs of MOOC learners during course design, and some even described efforts towards personalization (Bonk et al., 2018).

Impact of Designing for Equity and Inclusion on Learning

Learners who enroll in MOOCs enter with a variety of expectations and prior experiences. Intercultural differences in the way learners perceive expectations and communicative norms could lead to tensions during interactions and discussions, which may inhibit learner engagement and motivation reinforcing feelings of difference (Andersen et al., 2018; Lawrence, 2013). Intercultural competence can be defined as the "cognitive, affective, and behavioral skills and characteristics that support appropriate and effective interaction in a variety of cultural contexts" (Bennett, 2014, p. 157). Croft & Brown (2020) suggested that a lack of racial and cultural diversity amongst higher education faculty could perpetuate implicit biases within their online courses, because they base their assumptions about online learners on personal experience, believing them to hold the same kinds of privileges that they have themselves. Within the MOOC environment, faculty are designing for undefined audiences and may view them as a homogenous group (Macleod et al., 2016).

Some of these tensions can be addressed through the design of the learning environment itself. In terms of bringing learners into an experience in the first place, Kizilcec et al. (2019) theorized that diversity statements within MOOCs could influence enrollment patterns, but suggested that more work is needed to develop diversity statements that are effectively reliable in advancing these goals. Kizilcec et al. (2019) also investigated the impact of psychological cues (e.g., written content, visual design, and interaction design) on enrollment and participation in a statistics MOOC and found that changes to a course image and description appeared to lead to increased enrollment for women (Kizilcec et al., 2017). Thus, the learning environment should promote a sense of safety and trust for sharing ideas and critical reflections related to content and tasks that welcome diverse perspectives and multiple literacies (Blayone et al., 2017; Loizzo & Ertmer, 2016; Marshall, 2014; Stewart, 2013). In order to foster intercultural competence and respect learners' prior experiences and beliefs regarding communicative norms, Loizzo and Ertmer (2016) suggest acknowledging the notion of "lurking as learning" by removing discussion forum posting requirements and encouraging collaboration beyond platforms (p. 1022). Moreover, the peer-review process for assignments can be utilized as a feature to build intercultural competencies for learners to have space to reinforce content and expand their worldviews through collaborative interactions (Bali, 2014; Loizzo & Ertmer, 2016).

Methods

Research Team

As researchers, our interpretations are filtered through our social identities, and "all research is "positioned" within a stance" (Creswell, 2013, p. 215). We provide a description of our research setting and our positionality as researchers for the sake of transparency (Malterud, 2001). Our research team consists of four learning experience designers who work within a provost-funded instructional services unit to support faculty interested in advancing online learning experiences. As a team, we shared responsibilities for research design, data collection, and analysis. We examined course content for every course and distributed the data analysis work as evenly as possible. Additionally, we took care to analyze courses for which we were not the assigned learning experience designers. During our investigation, we worked together in person and also asynchronously using collaborative word processing tools. We frequently engaged in reflexive dialogue during our research meetings when we discussed our values, beliefs, and interpretations of data to develop a shared understanding.

Context

In concert with a university-wide initiative, the instructional services unit developed a DEI strategic plan, which focused on their specific context—open online courses. At this time, the MOOC proposal form was updated to reflect the unit's commitment to DEI asking faculty to outline goals and describe how their course design would contribute to the university becoming more diverse, equitable, and inclusive. The question is open-ended, broad, and yielded a variety of faculty responses and goals. Faculty were not explicitly asked to relate their DEI goals with the university or instructional unit's broader strategic DEI plan.

When we began the investigation, this updated DEI question within the proposal had been in use for three years, allowing for the development of a sufficient number of courses to provide insight into the manifestation of faculty course design goals. We were specifically interested in understanding the range of goals that were articulated in proposals and the extent to which these goals were instantiated in various MOOCs.

Study Design

Data collected for this study included faculty responses to the DEI question in the MOOC proposal and textual elements from corresponding courses. We conducted the study in three phases (see Figure 1):

- **Phase 1: Select MOOC proposals.** We established a set of inclusion criteria to select course proposals and corresponding course designs:
  - the proposal must respond to the DEI question about how the proposed MOOC addresses DEI goals set forth by the university;
  - the proposed course must fall into the open-content category (i.e., with no restrictions on enrollment);
  - the proposed course must be live (i.e., not archived).

Based on these criteria, we identified 11 MOOC proposals in total. Six of the selected proposals were for single MOOCs, or stand-alone courses that are typically estimated to take four to six weeks to complete. The other five proposals were for a MOOC series or a set of three to six related courses meant to be taken together.

- **Phase 2: Code MOOC proposals.** We modified the National Center for Institutional Diversity's Framework for Diversity Scholarship (NCID, 2021) (see Appendix A) for use in the MOOC context and used it to deductively code 11 MOOC proposals (see Appendix B).
- **Phase 3: Review live MOOCs.** We examined the MOOCs (n=32) that were developed from the 11 proposals identified through our selection process, looking for evidence of ways in which DEI goals were realized in the design of each course through deductive and inductive coding.
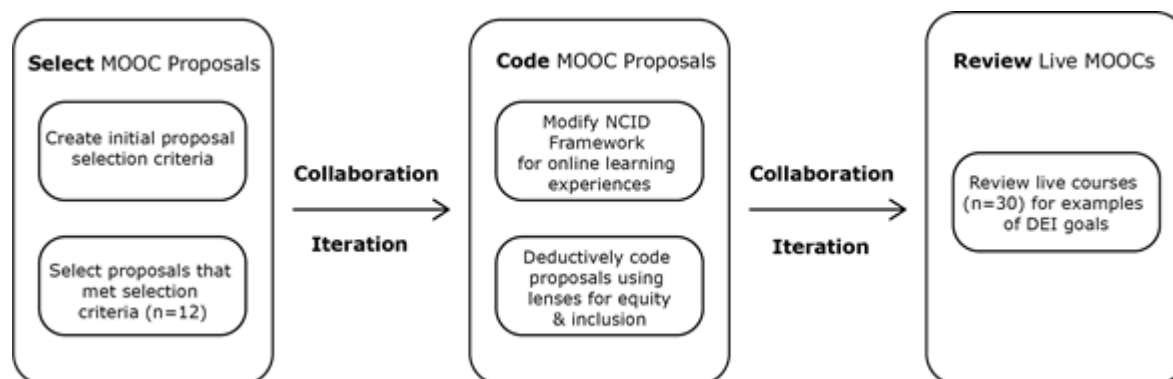
Figure 1

Overview of Three Phases of the Study

Phase 1: Select MOOC proposals. We established a set of inclusion criteria to select course proposals and corresponding course designs: the proposal must respond to the DEI question about how the proposed MOOC addresses DEI goals set forth by the university;

Analysis

We engaged in qualitative content analysis (Elo & Kyngäs, 2008), using an iterative and flexible approach that included inductive and deductive coding to identify themes (Deterding & Waters, 2018). Using a deductive approach, we analyzed stated course design goals in response to the DEI question from the MOOC proposal. To begin our analysis, we explored potential thematic categories and discovered NCID's Diversity Scholarship framework. NCID's mission is to bring together interdisciplinary scholars to pursue research to create a more equitable and just society. The framework presents categories of diversity scholarship, which we modified for use in the online course design context and used as a coding scheme for the first phase of analysis (see Appendix A).

While coding the equity goals, we first identified discrete excerpts from MOOC proposals related to one or more dimensions of the modified NCID framework. Second, we coded these excerpts, applying dimensions from the modified NCID framework. Third, we reviewed the coded goals taking into consideration the affordances of the MOOC environment and what would reasonably be instantiated in a course for global learners. For example, some proposals included additional DEI goals that went beyond the course design and were related to the impact on faculty's pedagogy in general or the dissemination of course materials to university personnel for professional development. Goals such as these were excluded from our analysis.

After the initial analysis of the proposed DEI goals, we performed an artifact analysis of course elements found within each MOOC. We examined a variety of textual elements found within the design of each individual MOOC including course syllabi, video transcripts, discussion prompts, course readings, and assessments. Visual and graphic elements of the course were not included in this stage of the analysis. Each researcher was assigned two single MOOCs and 5-7 individual courses within a MOOC series. Our individual analyses of assigned courses consisted of an initial close reading (line-by-line) of textual course elements in which relevant excerpts or descriptions were recorded, coded, and memoed in relation to the associated NCID dimensions identified in the initial proposal analysis.

Following the initial close reading, the research team convened to discuss and come to a consensus about the extent to which the coded artifacts related to the DEI goals from the proposal would be considered in the analysis. Coded instances were counted in the final tally if they met the following criteria (see Tables 2-3):

1. Elements were deemed by the team to be related to the stated DEI goals from the proposal (e.g., stated goal of featuring rural library examples to increase diversity in the field of librarianship coupled with rural library case studies throughout the course)
2. Elements were sustained across the course OR where they were deemed to be impactful in relation to learner experience and other course elements (e.g., sustained assessment techniques drawing on learner lived experiences/contexts or a single culminating assessment drawing on learner lived experiences/contexts).
3. Elements that appeared more than once throughout the MOOC series (e.g., introductory videos) were counted as one instance.
4. Textbooks used throughout a single course were counted one time.

Our analysis was limited in the sense that faculty and design team intentionality was not addressed and the analysis was from the perspective of outside designers attempting to draw connections between proposed goals and course elements after the course had already been designed and launched.

Findings

Proposed DEI Goals

Faculty proposed a range of DEI goal types in their MOOC proposals. An overview of the findings for the initial DEI goal analysis in relation to the NCID Framework themes for both single MOOCs and MOOC series is presented in Table 1. Our findings show that on average, single MOOC proposals tended to outline more goals related to DEI than MOOC series. Both single MOOCs and MOOC series proposed goals most commonly aligned with the *Addressing Social Inequality* theme.

The *Climate Change Action* single MOOC was an outlier in that our team coded seven DEI-related goals in the proposal across four of the five themes: Addressing Social Inequality, Recognizing the Impact of Power and Privilege, Including Multiple Perspectives, and Valuing Individuals. (see Table 1).

Table 1

Prevalence and Description of DEI Goals by NCID Framework Theme

Theme	MOOC Type	Instances	Description of Goals
Addressing Social Inequality	Single	6	• Expanding educational access within US & globally • Increasing learner capacity to address inequalities
	Series	3	• Expanding educational access within US & globally
Including Multiple Perspectives	Single	5	• Inviting guests & outside experts • Incorporating content featuring non-US & underrepresented perspectives • Incorporating content a variety of representing social identities • Interdisciplinary perspectives • Learner sourced content
	Series	1	• Utilizing non-US examples that are applicable across the globe
Valuing Individuals	Single	4	• Using inclusive pedagogies & UDL • Exceeding accessibility standards • Valuing learner lived experience & context
	Series	2	• Including personalized & self-directed learning • Including opportunities for learner choice

Theme	MOOC Type	Instances	Description of Goals
Recognizing the Impact of Power and Privilege	Single	4	• Including content explicitly outlining disparities caused by imbalances of power & privilege
	Series	0	• Not identified
Finding Common Ground	Single	1	• Facilitating difficult conversations when discussing the complexity of diversity, equity, & inclusion
	Series	1	• Facilitating social learning with learners who have different lived experiences

Manifestations of DEI Goals Within Courses

In the following section, Tables 2 and 3 delineate tallies of coded instances in each course or series. Notable findings and outlier cases are organized by the themes used to code DEI goals in proposals, which will allow us to represent relationships between goals stated and their instantiations (or lack thereof in some cases).

Table 2

Instantiations of DEI Goals by NCID Framework Theme: Single MOOCs

	Addressing Social Inequality (n)	Including Multiple Perspectives (n)	Valuing Individuals (n)	Recognizing the Impact of Power & Privilege (n)	Finding Common Ground (n)
Searching in the Health Sciences	2	7	2	n/a	n/a
Climate Change Action	1	23	5	2	n/a
Introduction to Dentistry	9	n/a	n/a	n/a	n/a
Enacting Social Change	3	5	n/a	n/a	n/a
Higher Education Leadership	n/a	7	n/a	2	1
Implications of Decision Making in Accounting	0	n/a	0	n/a	n/a

Table 3

Instantiations of DEI Goals by NCID Framework Theme: MOOC Series

	Addressing Social Inequality (n)	Including Multiple Perspectives (n)	Valuing Individuals (n)	Recognizing the Impact of Power & Privilege (n)	Finding Common Ground (n)
How to Manage Public Libraries on a Budget	46	n/a	n/a	n/a	n/a
Advanced Applications of Python	n/a	n/a	8	n/a	2
Utilizing Python for Statistical Calculations	n/a	7	9	n/a	n/a
User Experience Research and Design	5	n/a	n/a	n/a	n/a
Basics of Web Applications	59	n/a	n/a	n/a	n/a

The following section is organized thematically by goal type. We describe findings from courses and series in which we identified the highest number of instantiations of proposed DEI goals. We also describe notable or unique instances as

well as outliers. A summary of types of DEI goal instantiations for MOOCs and series organized by theme is included in Table 4.

Table 4

Summary and Descriptions of Common Instantiations of DEI Goals in MOOCs

Theme	MOOC Type	Summary of Instantiations
Addressing Social Inequality	Single	• Faculty lecture videos discussing social inequalities • Guest interviews discussing social inequalities • Readings created by faculty • External readings such as website or news articles • Culminating action-oriented assignments • Quizzes assessing content related to addressing social inequality
	Series	• Course syllabi statements explicitly stating faculty commitments to expanding educational access for the content area/profession • Faculty lecture videos discussing social inequalities • Guest interviews discussing social inequalities • Tutorial videos in which faculty discuss expanding access to guided walkthroughs of content • Use of OER textbook
Including Multiple Perspectives	Single	• Faculty interviews of other academics and experts • Textual vignettes of experts' stories • External videos (e.g., YouTube, TEDx) • External readings (e.g., news articles, websites)
	Series	• Lecture videos defining US-centric jargon and offering alternative ways of thinking about concepts • Optional practice resources based on datasets from around the world
Valuing Individuals	Single	• Accessible captions for videos • Video transcripts • Accessible lecture slide files • Activities in which learners share their stories and local contexts • Assignments focused on learner lived experiences and their impact on their local contexts
	Series	• Curated list of external coding tutorials for learners with less coding experience • Curated lists of definitions and common notations for learners with less coding experience • Specially developed interactive OER text with auto-graded exercises and elaborative feedback • Goal-setting assignment to help learners identify their goals for the course • Open-ended code drawing assignment posted in an interactive gallery for viewing (similar to a gallery walk)
Recognizing the Impact of Power and Privilege	Single	• Guest interview with climate activist discussing the impact of climate change on under-resourced communities around the world • Campus map labeling activity for which learners label physical spaces on campus that represent power • Discussion prompt asking learners to reflect on-campus structures that perpetuate inequality
	Series	• N/A
Finding Common Ground	Single	• Discussion prompt asking learners to reflect on the multiple student perspectives of contested campus discourse

Theme	MOOC Type	Summary of Instantiations
	Series	• Discussion prompt asking learners to reflect on the multiple student perspectives of contested campus discourse • Code drawing assignment in which learners are asked to respond to each others' drawings and provide constructive feedback • Peer-review assignment asking learners to provide constructive feedback

Addressing Social Inequality

Addressing Social Inequality was the most common theme applied to goals in single MOOC proposals with five out of six proposing this goal type. Of the proposals coded with this theme, all but one, *Implications for Decision Making in Accounting*, included manifestations of the goals proposed. *Introduction to Dentistry* exhibited the highest number of manifestations of the theme (n=9). Within the introductory module, five lecture videos, three readings, and one quiz focused on addressing the lack of access to dentistry education and resulting lack of diversity in the profession in the US. While not the highest number of instances, *Climate Change Action* includes specific examples of actions to take each week related to inequality and climate injustice at the individual, community, political, and adaptation levels (e.g., individual sustainability, community organizing, and writing to politicians). Each week, learners engage in a self-reflection quiz in which they are prompted to check off the actions they took toward climate justice. Additionally, the culminating assessment within the course is an individual climate action plan related to each of the levels of action outlined each week.

Of those three series, *Basics of Web Applications* (n=59), a four-course series, exhibited the highest number of manifestations of proposed goals. Goals were made visible through tutorial videos the instructor referred to as "code walkthroughs" in which coding mistakes by experts were normalized.

Although *How to Manage Public Libraries on a Budget,* an eight-course series, did not exhibit the highest number of instantiations of this goal (n=46), an interesting pattern emerged in the data. The series was developed by a large instructional team of outside experts led by one faculty member. Courses taught by the lead faculty member had the highest number of goal manifestations.

Including Multiple Perspectives

Four out of the six single MOOC proposals included goals related to the theme of *Including Multiple Perspectives* and manifestations of goals were found in each of the four courses that proposed this type of goal (see Table 4). *Climate Change Action* included the highest number of instantiations of the theme (n=23). The proposed goals related to this theme included perspectives that would not typically be found in a MOOC and seeking guests representing diverse experiences and social identities. This course was unique in that it was co-developed by students working with the faculty and design team, which was outlined in the syllabus. Each of the seven weeks featured seven students interviewing seven guest experts in the field and additional readings outlining the stories of community organizers outside of academia.

Using Python for Statistical Calculations, a three-course series, was the only MOOC series proposal to include a goal related to the theme of *Including Multiple Perspectives*, which focused on including examples and data from outside the US and offering explanations and where possible, alternatives to US-centric jargon. In total, seven manifestations of the stated goal were identified. Within the series, two videos spent time explicitly breaking down some of the jargon used that was US-centric (e.g., describing the US census process and various acronyms related to datasets) and three videos touched on topics applicable to settings outside of the US such as population health and people who have taken swim lessons. Furthermore, extension activities within the resources section provided exercises using global current issues datasets.

Valuing Individuals

Three of the six single MOOC proposals included goals related to the theme of *Valuing Individuals*. Of those three, only two included manifestations of the goals (*Strategies for Searching in Health Sciences* and *Climate Change Action*). *Implications for Decision Making in Accounting* stated the goal of creating course content and assessments that "reflect the diversity of the country and the globe". While there were many case studies outlined detailing both fictional and real companies, the diversity was mainly reflected in the function of the company. Within examples provided, one reference to a Canadian company was identified and company types included restaurants, vineyards, bakeries, and jewelers. Many examples included specific references to the city in which the university is located.

Two out of five MOOC series, *Utilizing Python for Statistical Calculations* and *Advanced Applications of Python*, included goals related to the theme of *Valuing Individuals*. Within *Utilizing Python for Statistical Calculations*, the proposed goals of meeting learners where they are and providing opportunities for learner choice were made visible through the use of a variety of additional resources such as YouTube Python tutorials, a supplemental resource with frequently used notations and definitions, and a learner-sourced frequently asked questions page to provide additional support for those who may not have as much experience with Python.

Advanced Applications of Python proposed the goal of providing a personalized learning experience through the use of automated feedback on low-stakes exercises. All five courses in the series utilized an interactive OER textbook with auto-graded exercises and elaborative feedback. The textbook was specifically developed for a residential course related to this series. Additionally, this course linked out to two tools geared toward personalized learning. One tool allowed learners to set and track learning goals for the course and the other was used to allow learners to create their own drawings via code to share with others.

Recognizing the Impact of Power and Privilege

Two out of the six single MOOC proposals included goals related to the theme of *Recognizing the Impact of Power and Privilege—Climate Change Action* and *Higher Education Leadership*. Both courses exhibited instantiations of the proposed goals. *Climate Change Action* included a question and answer session with a climate activist outlining the disproportionate impacts of climate change on under-resourced communities around the world. Additionally, a link to a website exploring this topic in relation to Ecuador was included as a specific example.

The instantiations identified in *Higher Education Leadership* involved an activity in which learners were prompted to examine campus maps and label physical spaces on campus that represent power and importance. Additionally, a discussion prompt asking learners to reflect on the ways in which structures on campuses perpetuate inequality.

Finding Common Ground

Higher Education Leadership was the only single MOOC proposal to relate to the theme of finding common ground. One module focusing on the topic of contested discourse (discussed above in the *Including Multiple Perspectives* section) ended with a discussion prompt asking learners to reflect on the multiple student perspectives with which they just engaged and outline how they would work toward resolving similar disputes on their campuses.

Advanced Applications of Python was the only MOOC series proposal to outline a goal related to the theme of *Finding Common Ground*. The proposal emphasized the importance of learners engaging in social learning with others with different lived experiences. Two assessments with social learning components were identified. One instance in the first course involved a linked tool that allowed learners to post drawings created with code to a gallery for peer comments and feedback (similar to a digital gallery walk activity). The second instance was identified in the fourth course and was a culminating peer-review assignment. Both instances involved the social aspect of learners communicating with one another about their work; however, no specific communication guidelines or reminders for students to practice providing constructive feedback were included.

Discussion

What Types of DEI Goals Were Proposed?

A range of goals were proposed with respect to the NCID themes and also their level of specificity. A clear pattern emerged in relation to the high frequency with which broad, less specific goals focused on expanding educational access were proposed. Notably, the goal for *Climate Change Action* and *Enacting Social Change Through Narrative Experience* moved beyond expanding access and incorporated more specificity and cited the need for learner agency and activism (via climate justice and local activism). It is perhaps reasonable to posit that the subject matter of these courses and their relation to social justice issues necessitated the invitation to action on the part of the learner.

The proposal of broad goals related to expanding access to education aligns with current research on faculty motivations for designing MOOCs (Kolowich, 2013; Hew & Cheung, 2014; Freitas & Paredes, 2018). Numerous studies critique some MOOC advocates for being overly ambitious about their potential for expanding educational access and educational equity across the globe (Ebben & Murphy, 2014; Toven et al., 2014; Portmess, 2013). As learning experience designers, it may be helpful to provide faculty with research that critically examines such claims and provides further insights into the complexity of designing MOOCs for global audiences (Portmess, 2013; Rhoads et al., 2013; Kizilcec et al., 2017). Furthermore, our findings suggest that learning experience designers may be able to assist faculty to develop shared, specific DEI goals at the onset of the project in order to promote their enactment in the final course design (Cvitanovic et al., 2020).

How Were Goals Enacted in Course Designs?

Our findings revealed a relationship between goal type and the way in which goals were enacted in courses. Didactic video and text content within the MOOCs and series was the most prominent way in which proposed DEI goals were realized in relation to the most common goal type, *Addressing Social Inequality* (see Table 1). Conversely, *Valuing Individuals* and *Finding Common Ground* related goals were more frequently enacted through activities in which learners share and produce content via learning activities and peer-review type assessments. Bali et al. (2020) delineate typologies of open education practices on a continuum from content-centric to process-centric. Within content-centric practices, the content is the main focus whereas process-centric practices focus on the process of learners sharing and producing their own content contributions. In Figure 2, we use the content and process-centric typologies described by Bali et al. to represent the ways in which DEI goals were realized in courses.

Figure 2

Instantiations of DEI Goals within Courses

Instantiations of DEI Goals within Courses
Across Single MOOCs & MOOC Series
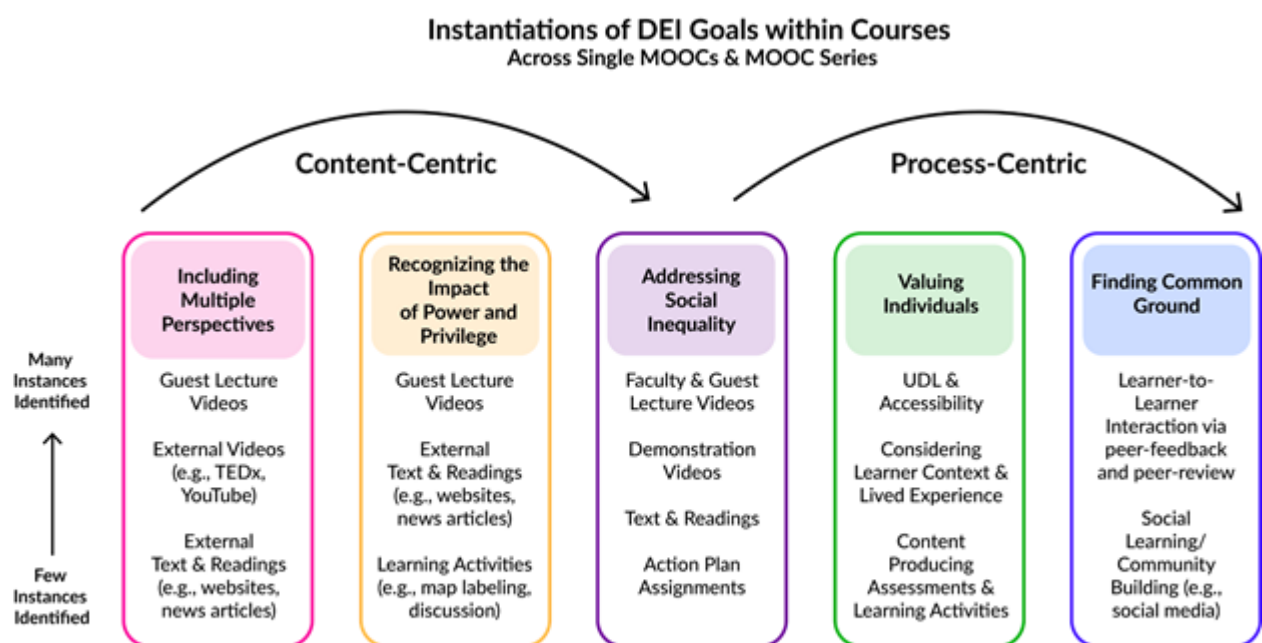
Five columns representing the five themes from left to right (Including Multiple Perspectives, Recognizing the Impact of Power and Privilege, Addressing Social Inequality, Valuing Individuals, and Finding Common Ground). Above the five columns are two arches with arrows pointing left representing a content-centric and process-centric continuum. The arches meet above the Addressing Social Inequality column. Within the columns are general descriptions of DEI goal manifestations from top to bottom or from many instances identified to fewer instances identified. The Including Multiple Perspectives column (on the left) includes the following instances from top to bottom: guest lecture videos, external videos (e.g., TEDx, YouTube), and external text and readings (e.g., websites, news articles). The second column, Recognizing the Impact of Power and Privilege, includes the following instances from top to bottom: guest lecture videos, external texts and readings, and learning activities such as map labeling and discussion. The third column, Addressing Social Inequality, includes the following instances from top to bottom: faculty and guest lecture videos, demonstration videos, text and readings, and action plan assignments. The fourth column, Valuing Individuals, includes the following instances from top to bottom: UDL and accessibility, considering learner context and lived experiences, content producing assessments & learning activities. The fifth column, finding common ground includes the following instances from top to bottom: learner-to-learner interaction via peer-feedback and peer-review and social learning or community building via social media.

Based on our findings, we draw two conclusions related to the content and process typologies described by Bali et al. First, video and text content—especially when it does not have to be created by faculty or design teams—may be an efficient way to address DEI goals when barriers to other means may be present (i.e., time and resources). Second, MOOC platform affordances do not always allow for the realization of process-centric goals. For example, some platforms provide little in the way of dialogue and sharing and tend to rely on asynchronous threaded discussions and peer-feedback communication tools. Studies have shown, however, that learner participation in MOOC discussion forums involves a relatively low number of learners and those that do participate are generally a homogenous group of professionals from the Western world who are well-educated (Gillani & Enyon, 2014; Ayer et al., 2018). Alternatively, Ito et al. (2020) suggest connected learning environments provide opportunities for learners to share "work, skills, and knowledge across networks, groups, and communities . . . [through] [b]logging, publishing work, or streaming" (p. 61). These forms of engagement and communication are typically not available MOOC learning platforms but may be possible by integrating or linking out to other tools as was the case in *Climate Change Action* and *Advance Applications of Python*.

Our findings also suggest differences between DEI goal development and course design for single MOOCs and MOOC series. Single MOOCs tend to exhibit a greater number of enacted DEI goals whereas MOOC series were less consistent in terms of enacting DEI goals. We postulate this difference may be attributable to three potential features of designing MOOC series. First, the scope of work involved in designing a series of MOOCs is substantially more than that of designing a single MOOC. Second, MOOC series require coordinating design efforts across multiple courses increasing the complexity of the design work. Third, MOOC series are often led by teams of faculty members, with individual faculty responsible for parts of the design. The individual motivations of faculty on teams may present challenges for cohesively enacting DEI goals across courses, which may have been the case for the *How to Manage Public Libraries on a Budget* series team. MOOC series design projects will likely require higher levels of support and attention in order to realize DEI goals. Learning experience designers and faculty leads should attempt to ensure DEI goals are collaboratively developed, that plans for implementation are put into place for each course, and that time is taken to holistically examine the series for the enactment of goals.

Limitations and Future Work

Our study is limited in the sense that it is situated within a single instructional services unit at a single university. Our inclusion criteria resulted in a fairly small number of courses and series to analyze, namely courses that were included within the unit's new proposal template and were "live" at the time of analysis. Since the time of writing, several more courses and series have been completed that meet our inclusion criteria. Furthermore, our chosen methodology, document analysis, may be insufficient to adequately address the nuances of faculty stated and realized goals (Bowen, 2009). Future work could include interviews with faculty to flesh out course goals with respect to DEI more specifically. Future data sources could include interviews with MOOC learners to better understand their experience of taking a course or series, to provide further data concerning whether or not course DEI goals were realized.

Our team is committed to examining our design processes and conducting further design-based research to explore opportunities to enact equitable and inclusive design principles. Since the time of writing, we have created resources to support faculty and design teams. First, we developed a guide (with feedback from our colleagues) for using the modified NCID framework as a set of lenses for critical reflection and a catalyst for action at various points during the design process. Second, a number of our team members, along with colleagues from the instructional services unit formed a group tasked with developing a repository of equitable and inclusive design examples to share with faculty during course design. Third, the instructional services unit is developing processes to assist faculty in the development of actionable DEI goals within the proposal that will be communicated to design teams. Beyond our institution, resources such as design guides and repositories will be important as universities are forced by COVID-19 to enter online spaces with a renewed attention to issues of racial injustice and inequity worldwide. Providing additional research-informed guidance for faculty and course design teams will be essential for continued efforts to design equitable and inclusive online learning experiences open to global audiences.

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Appendix A

Modified NCID Framework

Addressing Social Inequality	Proposal indicates a potential emphasis on historical and contemporary issues of social inequality across societal contexts and life domains (e.g., in education, arts and culture, health and mental health, economic and occupational attainment and mobility, infrastructure and community development).
Finding Common Ground	Proposal addresses challenges that arise when individuals from different backgrounds and frames of reference come together. The proposal demonstrates attention to the variability in opportunities across significant societal contexts (i.e. schools and colleges, neighborhoods and communities, work teams in organizations, etc.).
Recognizing the Impact of Power and Privilege	Proposal seeks to promote understanding and awareness of systems of power and privilege and how these systems interact with groups historically underrepresented and marginalized based on identities including but not limited to race, ethnicity, gender, social/economic, class, culture, sexual identity, ability, status, and religion.
Including Multiple Perspectives	Proposal makes a commitment to include epistemological perspectives of those from disenfranchised populations within the content
Valuing Individuals	Proposal makes a commitment to utilizing inclusive pedagogies. Proposal seeks to value and incorporate the lived experience of learners who are represented in the course

Appendix B

Below are two sample MOOC proposals that were de-identified and coded using the modified NCID framework outlined in Appendix A.

How does your Initiative help the University of Michigan to become more diverse, equitable, and inclusive?

Climate Change Action
1) Our MOOC design will be based on best practices with regard to inclusive teaching and universal design. With the support of the instructional services unit , our MOOC will be ADA compliant. 2) Student developers received instruction on inclusive teaching during Fall 2016. We plan to acknowledge our limitation as instructors and will invite participants' diverse perspectives that may be lacking from our MOOCs conversation. We will work to ensure that our MOOC's presenters will consist of a diverse (based on gender, race, experiences) group of researchers, professionals and other individuals. 3) Our planned assessments will draw upon the personal experiences, locations, etc. of MOOC participants and our plan is to make participants' artifacts available/shareable on the site. Thus, some of the major contributions to diversity and inclusion will come from our participants themselves. This will also allow us to ensure that future versions of the MOOC will be more inclusive. 4) Environmental issues such as climate change disproportionately impact the underprivileged in society. Our MOOC will focus on actions that can be taken to address/respond to climate change and thus to assist those who may be most vulnerable or come from underprivileged communities.

Higher Education Leadership: How to Incorporate Diversity, Equity, and Inclusion

The leadership modules have been designed to integrate equity, diversity, and inclusion into how we learn about leaders and the process of leadership, and how we approach leadership development. It is our philosophy that equity, diversity, and inclusion are not simply important factors to consider in reaching many decisions, but integral to what it means to be a leader in today's higher education environment. Particularly in delivering this material to the university faculty and staff, the course will explicitly address the role of leadership—practiced at many levels—can contribute to furthering the university's goal to become a more diverse, equitable, and inclusive institution of higher learning. As further evidence of our intent, we have inquired of many scholars across a wide range of disciplines about the ways in which diversity is being approached in their fields. We have captured some of these perspectives in a book that informs many of the learning modules that are the backbone of the curriculum. Accordingly, we take a wide view of the concept of diversity, intentionally incorporating many forms of difference without losing sight of the particular biases and resulting injustices that, to our great remorse, have defined the American experience. Finally, we attempt to move beyond descriptions of the various institutional "-isms" that frustrate our progress toward equity and inclusion, and we steer away from relatively easy statements about "inclusive excellence" or "opportunity for all". The diversity terrain has been paced and trampled by too many simplified explanations. The era of good intentions has run its course. Now real leadership is needed, capable of fulfilling promises made in this generation and all that follow.

Appendix C

Single MOOC Title
Climate Change Action
Enacting Social Change Through Narrative Experience
Higher Education Leadership: How to Incorporate Diversity, Equity, and Inclusion
Implications of Decision Making in Accounting
Introduction to Dentistry
Strategies for Searching in Health Sciences

Series Title	Number of Courses
How to Manage Public Libraries on a Budget	8
Advanced Applications of Python	5
Utilizing Python for Statistical Calculations	3
User Experience Research and Design	6
Basics of Web Applications	4

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Chelsea Chandler is a Senior Learning Experience Designer at the Center for Academic Innovation. Chandler is passionate about equity and inclusion in education and much of her work revolves around supporting faculty and instructors in the design and development of rich, engaging, and inclusive online learning experiences.

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Yuanru Tan

The University of Michigan

As a Learning Experience Designer & Accessibility Coordinator at the Center for Academic Innovation, Yuanru collaborates with cross-functional course development teams to design online learning experiences with close attention to compliance with accessibility and usability principles. She serves as a resource within the Center for Academic Innovation for finding pedagogical and technological solutions that make our projects and tools highly accessible to our constituents. Yuanru develops and facilitates workshops across the University of Michigan to educate faculty and staff on online education accessibility (standards, tools, and best practices). Yuanru also collaborates with Center colleagues on conducting learning design and learning analytics research projects to deliver data-informed decisions to improve online course design.

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Designing for Every Student: Practical Advice for Instructional Designers on Applying Social Justice in Learning Design

Eliana Elkhoury & Fouzia Usman

Social Justice   Inclusion   Online Instruction

The authors propose a social justice lens to be adopted by instructional designers in designing curricula that serves the needs of all students while working towards creating an inclusive learning environment. They provide practical recommendations for practitioners in face-to-face, blended, or online settings focusing on five key areas: inclusivity, communication, content, flexibility, and feedback-seeking. Along with theoretical underpinnings, the authors define each of the areas and provide considerations and recommendations for practice that would be applicable in higher education settings.

Introduction

Due to the COVID-19 pandemic, the world has witnessed an immense shift to online education, and the uncertainty of the future modality of education has shed light on the important role that instructional designers play. At the same time, we as educators are becoming more aware of the diverse student demographics in our classrooms in terms of race, sexual orientation, ethnicity, and learning abilities, among other factors. As more institutions and instructors reach out to instructional designers for support, the role that these designers play in upholding social justice becomes central. Through their consultations and support, instructional designers have the opportunity to serve as ambassadors for more equitable, inclusive, and diverse education.

The goal of this paper is to explain the importance of using a social justice lens and considering how it can be put into practice in the classroom when designing curricula. We aim to provide practical advice to instructional designers on how to infuse social justice into their designs. This paper is significant to instructional designers in higher education, and industry who are interested in learning more about how they can include aspects of social justice within their educational setting.

We, the authors, have occupied multiple roles in higher education. Being visible minorities, we started as international students. Our experience was enriched by our diverse socio-cultural and pedagogical heritage, coupled with our Canadian experience. At the moment of this paper, our advice is based two-fold. First, on our work as educational developers focusing on equity, diversity, and inclusion, including alternative assessments, and second on our experience teaching in higher education. The recommendations included in this paper have been implemented by at least one of the authors.

What Is Social Justice and Why Does it Belong in Classrooms?

We start with the premise that critical theory gives rise to social justice. Critical theory is a theoretical framework that examines how power is created and maintained in society while taking historical, cultural, and ideological contexts into account (Moisio, 2013). Knowledge is socially constructed in that it is contextualized and reflective of the values and interests of those who produce it (Freire, 1996). In his 1937 essay "Traditional and Critical Theory", Max Horkheimer (2002) stressed that the main aim of critical theory is to promote a democratic society, emancipate the oppressed, and empower suppressed groups to achieve equality. All people belong to social groups through which they adopt identities based on characteristics including race, gender, class, and religion. Inequality occurs when some social groups are valued more than others, thus giving their members more access to available resources (Sensoy & DiAngelo, 2017). By resources, we refer to the basic human rights people need to survive and thrive, such as adequate healthcare, education, food security, housing, and financial security. From this perspective, society is stratified, divided, and unequal. Social justice seeks to recognize and change these deeply rooted inequalities. Limited access for certain social groups stems from the oppressive systems in place that pose as barriers for some people. These barriers operate at the macro level and are embedded within social systems. They are enforced through laws, legislation, and policies that function to serve one social group over another, hence perpetuating inequality. Such disparities have led to inequalities and injustices such as racism, sexism, genderism, classism, ageism, ableism, and many other "isms" that represent oppressive systems within our society.

In response, social justice calls for seeking equity, equality, and fairness amongst all people, regardless of the social groups to which they subscribe. Teaching is not a neutral act: As educators, we hold a position of power—to influence and make positive social change. Inequalities within society infiltrate our classrooms and our teaching practices through socialization, directly impacting students' learning experiences. The need to engage in social justice education is imperative during this time of changing student demographics. The student population is becoming much more diverse (Dedman, 2019), requiring that educators cater to varying learning needs. The diversification of the student body includes populations from racialized minority groups, LGBTQ2+, people with disabilities, and individuals from differing socioeconomic backgrounds, including low-income households. Within the realm of higher education, more non-traditional students are attending colleges and universities, including senior citizens.

In this article, we examine various ways by which educators can recognize oppression occurring within the classroom and mitigate it through learning design. We provide considerations for instructional designers on designing curricula through a social justice lens. We adopt Freire's (1996) focus on critical pedagogies and move away from traditional learning practices such as the 'banking model', a metaphor that was developed by Freire, depicting students as empty vessels that are to be filled with knowledge by the teacher (Freire, 1996). A key social justice pitfall of the banking model is that the power is retained with the teacher and the student's role is seen as that of a passive observer (Jackson, 2016). In contrast, we encourage instructional designers to use communicative dialogue as a catalyst to foster a more egalitarian learning space—a two-way process to enhance learning between the educator and the learner. We believe that communicative dialogue empowers students to take ownership of their own learning process.

More recently, there has been a tremendous focus on embracing equity, diversity, and inclusion (EDI) approaches in various fields, including education. As Freire (1996) noted, EDI amplifies anti-oppression and social justice into practice through critical pedagogies. Within a classroom, equity is ensuring that all students have access to resources that would enhance their learning while creating the least restrictive learning environment. Diversity is the appreciation of

the various perspectives in the learning process, and inclusion pertains to all students being treated as equals and being included in the learning process.

The instructional designer achieves EDI through knowledge and use of best practices and tools to design lessons and curricula. However, before incorporating EDI work into practice, the instructional designer must understand how oppression operates within society and leads to impacts on students and their learning. Educators must also have a strong foundational understanding of how inequalities can surface within a classroom (e.g., students representing various social groups, being in a society that values one group over another).

For that purpose, instructional designers and educators must both engage in critical self-reflection, not only to check in with their own pedagogical practices and philosophy but also to clarify how they socially identify and position themselves within society. Their work requires constantly engaging in self-reflection to enhance students' experiences.

Positionality and Critical Self-Reflection

Self-knowledge is a key component of building one's identity as an educator. Critical scholars have argued that because educators hold a position of power, there is a tendency for that positioning to lead to some voices being silenced and others favoured within the classroom. Instructional designers occupy the same role as educators when designing a classroom. Therefore, we believe that they also hold a position of power when it comes to empowering students. As unconsciously as this positionality may occur, critical self-reflection is important to understand one's own biases and their impact on one's pedagogical practice.

When engaging in social justice practice, it is important that instructional designers examine their own identity and how they position themselves within society. For example, a person identifying as a Muslim, middle-class woman of colour would hold a worldview that is different from that of a Christian, upper-class White man. These views acquired through individual lenses also impact how individuals decipher and disseminate knowledge, hence impacting the learners' experience.

In this exercise of self-knowledge, turning inward requires instructional designers to reflect on their values and belief system, critically reflecting on their role within social hierarchies. Raising their level of critical consciousness allows them to examine how, as instructional designers, they maintain social hierarchies within classrooms through their practices. As they reflect, they must ask themselves: Whose voices do we amplify? Who is mainly represented in our texts and through the curriculum? Whose voices are silenced? Whose are underrepresented? Reflecting on these questions can help to unpack biases that are normally in place due to a privileged position, in the classroom and society at large.

Designing with social justice in mind begins with self-reflection before any work has begun. An ongoing commitment of this sort requires individuals to check in with themselves from time to time, reflecting on their praxis and its impact. As they position themselves, their understanding translates into their design and how they disseminate knowledge.

As we proceed into this article, we invite you, the reader, to position yourself as both an individual and as an instructional designer as you examine the considerations and recommendations we have listed. Begin by asking yourself three probing questions:

1. What social group(s) do you belong to?
2. Which of your social identities are easiest to identify?
3. Which of your social identities are most difficult to identify?

Asking yourself these probing questions allows you to think about yourself in new ways. In doing so, you may identify as being part of a group that is advantaged (privileged, dominant), or targeted (minoritized, oppressed) within society. Your relation to a group further influences norms, values, and beliefs, which eventually flow into your practice.

Recommendations for Practice

After completing the positioning exercise, we invite readers to examine the following recommendations, which we have grouped into five areas: inclusivity, communication, content, flexibility, and feedback-seeking. We define each of the areas and provide considerations and recommendations for practice.

Inclusivity

Perhaps the most encompassing definition of inclusivity can be found in Foreman's (2008) book, *Inclusion in Action*. He defined inclusivity as the following:

> *A concept that extends well beyond students with a disability and encompasses the idea that all schools should strive to provide optimal learning environments for all their students, regardless of their social, cultural or ethnic background, or their ability or disability (Foreman, 2008, p. 31).*

A large body of work is concentrated on accessibility in learning design. The COVID-19 pandemic brought to the forefront issues of digital accessibility, which prompted recommendations for low bandwidth design and asynchronous design. We agree on the importance of those two recommendations and extend them to include the three stages of the digital divide: access, use, and empowerment (Hohlfeld et al., 2008). We also base our work on the premise that the digital divide extends social inequalities.

For the first stage of the digital divide, access (Hohlfeld et al., 2008), we recommend thinking about the diversity of students who will be taking the course. You are designing for learners who have full or limited access to technology (laptop, mobile, internet), learners who are taking the course in their first or second language, and learners who have no accommodation requirements or need visual or auditory requirements. For this level of accessibility, our recommendations could be summarized by following the universal design for learning by providing multiple opportunities for engagement, representation, action, and expression. In addition, plan for low bandwidth by providing asynchronous sessions and optimizing the documents used, such as PDFs, video files, images, and documents.

In addition to the accessibility needs of your students, it is important to consider how busy students could be. They might be trying to balance coursework with family duties, work responsibilities, caring for dependents, or simply caring for themselves. The COVID-19 situation is a great example of how learners can be pulled in multiple directions. Our recommendation is to plan for structure, consistency, and predictability in your design. Examples include having a similar module structure or weekly structure, similar communications, and set due dates. In the case of a capstone project, we recommend including an announcement at the beginning of the semester to give learners time to plan.

The second stage of the digital divide is related to use (Hohlfeld et al., 2008). Some learners are not able to use technology efficiently despite having access. Usability is affected by the diversity of students in higher education and the fast-changing technology. When students have access to course materials and tools, is everyone able to use them in the same way? It is important to think of the digital divide as multidimensional (Chipeva et al., 2018) where individual factors such as gender (Mumporeze & Prieler, 2017), personality traits, and socio-cultural factors among many others also play a big role.

Here are a few steps designers could take to address disparities in usage. First, if you are proposing that students use a tool that they choose, consider providing one or two examples with instructions. Learners might not know where to find a tool, so we recommend providing a curated list of accepted locations to look for a checklist of parameters that learners can use to make decisions. Similarly, provide usage instructions for any additional tool required. Finally, when assigning tasks that require use of a new platform, social media for example, keep in mind that not all users are comfortable or familiar with these tools. To mitigate any difficulty, provide alternatives or options and consider the time that a user needs to spend on a certain tool.

When it comes to the last stage of the digital divide defined by Hohlfeld et al. (2008) as empowerment it is important to think about the different roles of online users and the impact of participation equality.

Studies described the different roles of online users. Kamalodeen and Jameson-Charles (2016) analyzed the roles that teachers play in online communities and suggested that users have one of these five roles: content consumers, window-shoppers, content producers, collaborators, and leaders, while Risser and Bottoms (2014) used the terms newbies and celebrities to describe teachers' roles. Other researchers used different terms to describe user roles. For example, Choi et al. (2015), who analyzed user roles on Reddit, identified users as initiators, commentators, attractors, or translators. Similarly, Füller et al. (2014) identified six user types that they called socializers, idea generators, masters, efficient contributors, and passive idea generators. More recently, Akar and Mardikyan (2018) found that users could be either visitors, socializers, content generators, or passive members.

Regardless of the descriptors given to the online users and their roles, there was a consensus among researchers that not all users have the same contributions to online content (Muller et al., 2010). Participation inequality refers to the low percentage of active online participants (contributors) compared to silent users (lurkers). Contributors are participants who post online, whereas lurkers are those participants who browse content and seldom make their own posts. Some examples of this behaviour are found in posts to blogs, LinkedIn, Wikipedia, book reviews, TEDTalks, Google searches, and social media. As framed by Haklay (2016),

> The overwhelming majority of people who use the information or are registered to the service do not contribute any information to it. The proportion of registered people who do not contribute can reach 90% or even more of the total number of users. Of the remaining participants, the vast majority contribute infrequently or fairly little—these account for 9% or more of the users. Finally, the last 1% contribute most of the information (p. 36).

Participation inequality is relevant to instructional designers who are asking learners to look for online resources, as those learners will be exposed to the postings of a small percentage of users. To mitigate against it, give the students direction. For example, students could be given a list of accepted resources or provided with resources to critically reflect on the content that they are finding. The first author adopts this technique in her courses. She provides the students with a list of resources as a first step, in addition, the author allows the students to choose their resources and provides them with a check-in opportunity where they can submit the resources they would like to use and receive feedback.

Communication

Communication plays a central role, particularly in online classes. As an instructional designer, thinking about communication from a social justice lens will help you create a safe space and will allow students to make connections throughout the course to you, to the content, and to their colleagues. Whether you are designing the course, coaching instructors, or teaching the course, we have collected recommendations that can be applied to create social justice communication.

We base our recommendations on three theoretical frameworks: the online pedagogy of care (Burke & Larmar, 2020), the community of inquiry (Garrison & Akyol, 2013), and Moore's (1989) model of interaction. We expand upon them to include recommendations for social justice. We invite you to ask yourself if you have made it easy and safe for learners to reach out to you and if you have provided ways for learners to reach you if they have concerns about course content or interactions with other learners. Our recommendations cover setting the tone of the class and establishing contact protocols.

First, use anti-oppression statements to set the tone of the class and create identity-safe classrooms. Use pronouns to introduce yourself. Fuentes et al. (2021) encouraged instructors to "define intersectionality in the syllabus for their students, explain the role of institutionalized oppression within society, and enter an agreement with their students to do their best to not recreate systemic oppression within the classroom" (p. 74). Second, make it clear to learners how and when they can contact you or the course instructor and when they could expect a reply. Two methods that have worked well for us are to include a Contact Us tab in the learning management system or to establish a Q&A forum and populate it with questions, where the contact information is the first question. Third, explain to students how, when, and why they can contact you to report any concerning incidents in class (including those that arise from your own

behaviours). Finally, acknowledge the complexities of students' lives. This advice is modelled after Burke and Larmar's (2020) online pedagogy of care. Based on that acknowledgment, we recommend that Instructional designers use the pedagogy of care when checking in on students. For example, ask them if they are okay when they are late on submissions, and use restorative practice for missed work.

Content

The content that you as the instructional designer choose to include in your course allows you to architect a social justice class. Questions you should consider include the following: Do you have a wide representation in your course material? How affordable are the course materials? How do you portray to your students that your course is a safe space?

Having thought about these questions, our recommendation is to include EDI content, affordable content, and additional content. You can ensure EDI content by including diverse authors, perspectives, and ideas. Beware of oversimplification by including only some diverse content, and keep in mind that social justice education is not merely adding diverse content but raising critical consciousness about it. We invite you to consider what hidden curriculum you are using in your classroom and what hidden rules the students might perceive.

As for affordable content, consider choosing low-cost course materials. For example, select earlier editions of books or find open educational resources instead of high-cost books. An additional method to make your content aligned with social justice practices is to add a toolbox that connects the learners in your course to resources on campus. These resources could include support provided to ethnic minorities, LGBTQ2+, international students, and other potentially marginalized groups on campus. This gesture shows your students that you care and that it is safe for them to reach out to you. The first author found success in creating a space where students can suggest their own resources written by or representing minority groups. The first author created a folder in the learning management system called additional resources and students provided relevant and updated resources that some were included in the following versions of the course.

Flexibility

Flexible learning is centred around learner empowerment. This model of learning provides a new framework for the power frames in the academic context and allows for more contribution from the students (Ryan & Tilbury, 2013). There are two guiding principles behind our recommendation for flexibility: The first is that learners play an active role in their learning and the second is that learners bring valuable perspectives and experience to the classroom. Based on these principles, we recommend using co-construction and choice as a base for engaging and empowering students. Allowing students to co-construct the course gives value to their voices. Similarly, giving choice to students allows them to take ownership of their own learning.

Consider how learners could take ownership of the course, whether they have a choice to do so, and whose voice is being heard. Based on these considerations, we recommend providing opportunities for students to co-construct the class guidelines, the content, and/or the assessment protocols. Incorporating flexible learning is a daunting task, and therefore we recommend that instructional designers start small by choosing one task at a time.

Based on flexibility principles (Hart, 2000), areas (Palmer, 2011), and dimensions (Nikolova & Collis, 1998), we suggest four recommendations to provide flexibility that reflect social justice in their design. First, provide opportunities for students to take part in developing classroom guidelines and group work protocols. Second, allow students to co-create the curriculum by bringing value from their communities and their own experiences. Learners bring with them a wealth of knowledge, views, and perspectives that could be built upon as a liaison to their communities and families. For example, use an inquiry-based approach where learners ask a question that relates to their own community, or where they are asked to apply the content of the course to solve a challenge they see in their communities. Third, apply flexibility to your assignments and assessments (Irwin & Hepplestone, 2012). You could provide a choice for your students in the type of assessment they choose, the percentage assigned to it, or the topic of their assignment.

If you wish to make it easier for students to choose, you can include explanations about the outcome that students are looking for. For example, a statement could explain that students interested in creating a product to use later might prefer a portfolio assessment and students who prefer conversational assessment might prefer to choose an oral assessment.

Finally, to ensure equity of assessment for students coming from non-mainstream cultures or migrant families, we recommend culturally responsive assessment. Culturally responsive assessment needs constant dialogue and constant reflection. It creates a space where students feel safe asking questions and where their prior knowledge is accounted for (Stevens, 2012).

We have two recommendations to help instructional designers create culturally relevant assessments. The first author has been using syllabus annotation with her students. This technique allowed her to connect with the students and engage them around the syllabus. Students commented on what they thought about the assessment and they posted questions. This created a safe space for the students. Kalir and Perez (2019) and Kalir et al. (2020) are good resources to explore if you wish to learn more about social annotation of the syllabus.

The second technique focuses on using student-centered assessment. We recommend creating opportunities for students to be involved in the assessment creation. This could take the form of student-generated assessment (Yu, 2012), student-generated exam questions, and rubric co-creation with students. You can learn more about rubric co-creation with students from recent research such as Kilgour et al. (2020) and Bacchus et al. (2020).

Feedback-Seeking

Learners can provide designers with the most accurate feedback. Although it is a common practice to seek course evaluation, we recommend seeking feedback related to classroom climate and reflecting on that feedback. Feedback-seeking is the deliberate asking for input from participants. Ashford and Cummings (1983) first identified two modes of feedback-seeking, monitoring and inquiry. Monitoring happens when designers are attentive to the environment and recognize cues, whereas inquiry requires actively looking for responses from learners. Ashford et al. (2003) identified five aspects of feedback-seeking that included the method, the frequency, the timing, the target, and the topic. We would like to add an additional aspect related to actions following the feedback.

We invite instructional designers to consider if they have built monitoring or inquiry feedback into the course, if the feedback-seeking is inviting to the students, and if feedback is being sought about social justice aspects. instructional designers should also determine what actions to take after receiving the feedback. Our recommendations are centred around critical consciousness. Thus, we recommend devising opportunities for students to provide feedback at different times, including space for them to provide feedback informally. When feedback is sought, ask direct questions related to the course tone, the diversity of the course content, and how safe students felt to contact the course designer and/or instructor. Lastly, after receiving feedback, we recommend using the data to check positionality and critically reflect on choices made in the course.

Conclusion

We used this paper to provide practical advice to instructional designers, specifically in higher education, to design their courses from a social justice lens. Our first recommendation was to check one's own positionality and critically reflect on the role that positionality plays in designing a course. Following the self-reflection, we grouped our recommendations into five sections: inclusivity, communication, content, flexibility, and feedback-seeking. We provided a theoretical background for each of the sections in addition to considerations and recommendations to align each section with social justice.

We realize that a learning design that incorporates social justice cannot be achieved through a prescriptive list. We also realize that the recommendations we suggest are overwhelming and not easy to implement all at once. To that end, we advise instructional designers to take a critical, step-by-step approach to the recommendations. Implementing social

justice in course design is a journey of learning and self-reflection. Finally, we would like to acknowledge that social justice in education is a work in progress. Given that the field of social justice is continuously growing, we plan to include deeper considerations of each of these areas, as well as our recommendations on culturally responsive design and trauma-informed pedagogies, in our future research.

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Designing a Virtual Learning Environment for Critical Media Literacy Education

Ali Söken & Kysa Nygreen

Social Justice   Universal Design For Learning   COVID-19   Remote Learning   Online Instruction

Critical Media Literacy

In this reflective practitioner essay, we describe our redesign of a large undergraduate course, "Education and Film" (EdFilm), which teaches Critical Media Literacy (CML) to 181 students at a large state university. Using Practitioner Inquiry methods, we discuss the significance of the broader social context in shaping our design, show how we used Universal Design for Learning (UDL) to inform five design choices, and share outcomes from the course. Our findings indicate our course redesign increased flexibility and accessibility without sacrificing student learning outcomes. Reflecting on these findings, we argue for a redesign process that puts student learning goals at the center, considers the impacts of social context (especially with regard to social inequalities), and applies UDL to maximize accessibility and social justice.

Introduction

The summer and fall of 2020 were marked by a once-in-a-century global pandemic. In addition to fear, illness and death, the pandemic caused increased job loss, financial strain, and intensified caregiving responsibilities to many as businesses and schools abruptly shut down. In education, the shift to remote instruction revealed inequities in students' access to technology and suitable working/learning conditions. These challenges disproportionately affected students from lower-income households, and those who are Black, Indigenous, People of Color (BIPOC), widening inequalities already present in the educational system.

We were among the many educators who redesigned courses for a virtual learning environment during this crisis. In this reflective practitioner essay, we describe the redesign of a large undergraduate lecture course, focusing on how Universal Design for Learning (UDL) was used as a framework to inform five design choices centering on equity, accessibility, and social justice. The first section describes the aims of our instructional design – to develop students'

Critical Media Literacy (CML) in a course called "Education and Film" (EdFilm). This section also discusses our social identities and roles within the course. Second, we review the methods used for this paper, which we describe as Practitioner Inquiry. Third, we describe our instructional design process including the conceptual framework of Universal Design for Learning (UDL), the contextual factors and student characteristics considered, and our five design choices. Last, we share outcomes of the course focusing on two themes: student feedback and student learning. Data indicate our five design choices increased flexibility and accessibility, allowing students to develop and demonstrate the learning outcomes of CML. Reflecting on these findings, we argue for a redesign process that puts student learning goals at the center, deeply considers the impacts of social context (especially related to social inequalities), and applies UDL to maximize accessibility and social justice.

Instructional Design Aims

Our instructional design setting was a large undergraduate course, Education & Film (EdFilm), which serves approximately 180 students per semester at a large state university in the US. The central aim of the course is to develop students' Critical Media Literacy (CML) meaning the ability to decode and analyze media messages, and social contexts of media production, with attention to systemic inequality and power (Lewis & Jhally, 1998). While mainstream approaches to media literacy emphasize the decoding of media texts and components of media production, CML adds a critical-theory lens that considers the larger social context, the realities of systemic oppression, and the social and ideological effects of media messages (Kellner & Share, 2007). As applied in EdFilm, CML also includes the ability to self-reflect on one's own media socialization and implicit biases (Share & Thoman, 2007). CML aligns with social justice because it aims to develop students' critical consciousness to challenge inequality and enact social change (Kellner & Share, 2005; Butler, 2019).

EdFilm is a lower-division, general-education course that meets an institutional "diversity" requirement and draws students from every campus department and major. The course addresses diversity in education through analysis of major Hollywood films about education, using a CML lens. Students analyze movies such as *Freedom Writers* and *Mean Girls* considering three questions: (1) What does this movie teach about diversity and inequality in education? (2) How does it do that? and (3) So what? To engage the "so what?" question, students read research-based texts about diversity and inequality in education as well as media studies texts about the social impacts of media narratives and representations. The course introduces concepts such as systemic racism, the meritocracy myth, and heteronormativity to help students name the social structures that impact media and education, identify the ideologies present in media narratives, and describe how dominant narratives hurt certain groups. Students also reflect on their own media socialization and explore implicit biases.

Prior to the Covid-19 pandemic, EdFilm was taught in-person following a traditional lecture-style format consisting of a large weekly lecture led by the professor, smaller weekly discussion sections led by TAs, and periodic movie nights featuring a film screening followed by discussion. The instructor and TAs met regularly to reflect on the course, share pedagogical approaches, and align assessment. Nygreen, a faculty member, created EdFilm and has taught it for 16 semesters since 2011. She is a white, US-born, able-bodied, cisgender woman who identifies as LBGTQ. Söken, a doctoral candidate, has been a graduate Teaching Assistant (TA) for EdFilm since Fall 2019 and currently teaches an independent section of the course. He is an international student from Turkey, member of a religious minority, able-bodied, straight cisgender man and first-gen college student from a single-parent family. In the summer of 2020, we collaborated with other TAs to redesign EdFilm for a remote learning environment. Although three other TAs gave input into the process, we led the redesign effort, collected and analyzed the data, and developed the analysis presented. In this article, we utilize student data to answer two practice-driven questions:

1. How did students respond to the redesigned EdFilm course? What design elements increased accessibility of course content and engagement? (design questions)
2. Did students meet our desired CML learning outcomes? What does evidence of these learning outcomes look like? (student learning questions)

Methods

This paper builds from and reflects the tradition of Practitioner Inquiry (Anderson & Herr 1999; Cochran-Smith & Lytle, 1999, 2004; Cochrain-Smith & Donnell, 2006; Lagemann, 2000). Practitioner Inquiry is an umbrella term referring to educational research in which the researcher is the practitioner, the research site is the context, and the focus of the research is the teaching practice (Cochran-Smith & Donnell, 2006; Cochran-Smith & Lytle, 2004). Cochran-Smith and Donnell (2006) argue despite the differences in the individual genres under the category of practitioner inquiry, the shared features are noteworthy: (a) the practitioner is the researcher; (b) it aims to improve the practice by generated knowledge in the local context; (c) research questions arise from the site; (d) inquiry and practice are inseparable; (e) validity and generalizability do not follow the traditional definitions; (f) the research process is systematic and intentional; and (g) the knowledge is shared with a larger community to make the practice visible. The authors note "unlike the knowledge generated by outside researchers, the knowledge generated through practitioner inquiry is intended primarily for application and use within the local context in which it is generated" (Cochran-Smith & Donnell, 2006, p. 508). In line with these features, we did not initially set out to design a research study about the EdFilm class; rather, we collected student data in order to continuously reflect on and improve our instructional design. We then systematically analyzed the data to answer our practice-driven research questions. While our primary purpose was improving our practice, we also believe our findings contribute insights to the instructional design field.

Data Collection

To answer the design questions, we used student surveys administered during the Fall 2020 semester consisting of: a pre-course survey distributed one week prior to the first class; two surveys distributed in weeks three and seven respectively; and an end-of-semester course evaluation. Surveys were distributed via email to the class list and posted on the course Moodle page (i.e., the Learning Management System) with frequent reminders. Surveys asked students about general wellbeing, accessibility issues, feedback on the course, and self-assessment of their own learning. While teaching during the fall 2020 semester, we reviewed responses to each survey immediately to identify recurring themes. We discussed the themes in our TA meetings and made adjustments to course design based on student feedback. To answer our student learning questions, we analyzed two types of student work: reflective journals (formative assessments) and student papers (summative assessments). These assignments were given three times throughout the semester. It is important to note, in addition to student data, this paper draws on our collective reflections and notes from our instructional design process.

Data Analysis Procedures

To analyze student survey responses, we reviewed our TA meeting notes from the Fall 2020 semester to re-visit our initial interpretations of survey data. Second, we re-examined the data to identify additional themes and larger recurring patterns. To analyze student work, we reviewed work samples to identify examples considered evidence of CML competency as well as evidence of superficial learning or misunderstandings. To narrow the quantity of papers to review, we selected student work from one of the six Discussion Sections (30 students). We skimmed all 30 papers and journals for exemplary examples, and conducted a close reading of those in the top and bottom third of the grading distribution. We also reviewed meeting notes from teaching-team meetings in which TA's discussed the quality of student work and shared work samples to align assessment. Before turning to our findings, we first describe our instructional design process.

Instructional Design Process

This section describes our instructional design process, including the Universal Design for Learning (UDL) framework guiding us, the contextual features and student characteristics we considered, and our five design choices.

Universal Design for Learning

We began the redesign process by (re)articulating and clarifying our CML student learning goals and the importance of CML in the present historical moment. We put these learning goals at the center and then worked backwards to design learning experiences that enable students to develop and demonstrate goal achievements. While centering CML learning outcomes, our redesign process was guided by UDL our consideration of the social context and our students. UDL is a learning design framework emphasizing accessibility of learning design for students of diverse backgrounds, strengths, abilities and prior knowledge. UDL is not a teaching strategy or a way to promote use of technology in the classroom; rather, it is a framework advancing social justice by ensuring that instruction is accessible to all learners (Pliner & Johnson, 2004). UDL aims to "maximize learning opportunities for every student" (Rose & Meyer, 2002, p. 5) by creating multiple means of engagement, representation, action and expression. According to CAST (2001), guidelines for implementing these three principles in the classroom include: (1) recruiting interest, sustaining effort and persistence, and self-regulation for *engagement* [the why of learning]; (2) perception, language and symbols and comprehension for *representation* [the what of learning]; (3) physical action, expression and communication, and executive functions for *action and expression* [the how of learning].

Hackman and Rauscher (2004) underline the connection between social justice and UDL as both prioritizing accessibility of learning materials to students from diverse backgrounds, and call for structural change not only leading to students' higher academic achievement, but also empowerment. Accessibility in this sense is deeper than criticizing the one-size-fits-all approach in teaching. As Pliner and Johnson (2004) state, "it is our ethical and moral obligation to transform the practice of accessibility" (p.112) to democratize higher education where certain populations do not have the same chances due to the systemic inequalities. There are many areas of synergy between the frameworks of CML and UDL. For example, both recognize how social inequality systematically disadvantages certain students, and both seek to advance student empowerment and social justice. Additionally, both consider the importance of social context on student learning and equity and support student-centered approaches to instruction. These aims and overarching values provide the theoretical underpinnings of EdFilm and informed our redesign process. Next, we discuss features of the social context and student characteristics considered in our redesign process.

Context and Student Characteristics

The social context of the summer and fall of 2020 was defined not only by the Covid-19 pandemic but also by a series of truly historic events: an uniquely-contentious and polarizing U.S. presidential campaign and election; a wave of racial justice protests in response to the police murder of George Floyd; media disinformation campaigns about the pandemic, the election, and the *Black Lives Matter* (BLM) movement; and rising poverty and inequality caused by the pandemic's disproportionate effects on low-income and BIPOC communities. These socio-political factors caused heightened feelings of stress, fear, sadness, and anger for many. The pandemic also created particular challenges for undergraduate students including social isolation, mental health struggles, and financial stress. The summer of 2020 was also a time of collective grief for those who missed out on adolescent rites of passage such as graduation, prom, athletics, dating, and the experience of "going away to college." We simply could not ignore the gravity of our historical moment when considering our course redesign for a remote learning context. We felt strongly that CML could empower students to understand, analyze, and meet the challenges of the current historical moment. We also recognized the need for flexibility, compassion, and humanization of the learning environment in order to support students through this unprecedented and grief-filled moment in history.

To gather information about our students' needs, constraints, and accessibility issues in relation to this context, we designed a pre-course survey distributed a week prior to the first day of class. The survey asked students about their general wellbeing, their hopes and fears for the semester, and their access to technology and other resources needed for success in college courses. The findings revealed that 64.7% of our students would be first-year college students, 11.8% were first-generation college students, and 22.1% held a full-time job. In open-ended questions, 47 students (34%) explicitly mentioned technological issues such as not having a reliable computer or internet connection. With these inputs, we recognized a need for asynchronous options to provide the most flexibility and accessibility. We also recognized the need for intentional support of first-year students transitioning to college.

Next, we considered what we knew about our students from teaching EdFilm previously. We reflected on three long-standing challenges of the course: large class size, uneven academic preparation, and uneven exposure to diversity. We knew these challenges, which we had wrestled with prior to the pandemic, could be exacerbated by the remote learning environment. First, with a class size of 180, it can be difficult to build community, forge personal relationships with students, or intervene if students disengage. Second, students come to the course with a wide range of academic preparation. While some require use of class time to review content from assigned readings or receive explicit instruction in academic reading/writing strategies, others come prepared to *use* texts and writing prompts as a jumping-off point for deeper engagement with overarching themes. Balancing these diverse academic needs while keeping everyone engaged has been a continual challenge, especially given the large class size and limited staffing.

The third and most difficult challenge, however, has been students' uneven exposure to diversity and social justice themes. A majority of our students are white, middle-class, U.S. citizens from college-educated households. It is common for students to begin the semester with a rudimentary understanding of, and sometimes dis-information about, diversity and social justice. Some students enter the course from a stance of resistance and skepticism, making it difficult to build a supportive community of learners. At the other end of the spectrum are students who are immersed in social justice work, or major in a cognate area of study (e.g. media studies, sociology, African American studies, Latinx Studies, Women/Gender/Sexuality studies), or identify as BIPOC or other marginalized identity. In addition, there are many international students bringing a distinct set of experiences and lenses to issues of social diversity in the U.S. The teaching team has long struggled with how to honor and validate minoritized students' experiences and the knowledge they bring to the classroom. Equally, the team grappled with how to provide these students a meaningful learning experience while also attending to the majority of students, unfamiliar with or holding misinformation about diversity, who need basic instruction.

Five Design Choices

Taking into account contextual factors, student characteristics, and the principles of UDL, we radically redesigned EdFilm. Our redesign is summarized through five design choices: (a) synchronous-asynchronous instruction; (b) modular structure; c) building an inclusive learning community; (d) using multimodality; and (e) collecting constructive feedback. The five choices align with UDL guidelines to provide multiple means of engagement, representation, and action/expression. They also support CML's emphasis on self-reflection and social justice.

Synchronous-Asynchronous Instruction

Our first design choice was to structure the course with a balance of synchronous and asynchronous instruction. The results of our pre-course survey suggested the importance of asynchronous options to provide the most flexibility and accessibility. Instead of weekly 75-minute lectures, the instructor recorded mini-lectures (7-10 minutes each) and posted them on the Moodle, with closed captioning and transcripts, for students to view at their own pace. Instead of movie nights, students could view films on their own time and submit written answers to a set of analytical questions. Although possible to succeed in the course through solely asynchronous participation, use of synchronous participation would support student learning and engagement. As such, we provided synchronous activities during all scheduled class times (i.e., three times each week) and strongly encouraged students to attend. Synchronous instruction included open office hours, interactive review sessions, virtual watch parties replacing movie nights, and discussion sections. The aim was to provide multiple opportunities each week for students to plug into the course, make contact with an instructor, (re)engage in their learning, and interact with peers and class material in a synchronous setting. This mix of synchronous-asynchronous learning opportunities supports the UDL principle of *engagement* because it allows for multiple forms of engagement, allows learners to follow the course at their own pace, and provides opportunities to build effort and persistence.

Modular Structure

Our second design choice was to shift from a week-by-week course schedule to a modular structure. Each module followed the same format, flow, and assignments – making an easier to follow pattern – allowing students to complete work at their own pace within each module. The content of every module included a set of readings (i.e., print and

multimedia texts), one movie, and a few recorded mini-lectures tying the material together and connecting it to assessment prompts. To engage with materials, students completed five activities (i.e., formative assessments) which offered a variety of ways to engage with content and represent what they learned. This reflects the UDL principles of engagement and representation. After two modules, there was a one-week pause when papers were due, called "breather week." This provided students time to catch up, catch their breath, and complete summative assessments thoughtfully before moving on to new material.

Building a Learning Community

Our third design choice prioritized community-building and humanized the learning process. We accomplished this by checking in with students about their general well-being at the beginning of each session, using energizer and community-building exercises, and using fun ways to engage with the material such as having students co-create memes in small breakout groups. For every module, TAs hosted live 50-minute discussion sessions and used the collaboratively created lesson plans. Friday discussions were a safe space for students to explore the course content in a deeper way with their peers. On alternate Fridays, TAs hosted virtual office hours for students who wanted to talk about the course or share concerns. Building an inclusive community of learners who trust each other supports the UDL principle of *engagement* and creates a setting that fosters the CML competency of critical self-reflection.

Using Multimodality

In the fourth design choice, we carefully curated course content to address students with different backgrounds and learning styles. In our redesign process, we radically updated the content to feature more up-to-date texts, a more explicit thematic focus on systemic racism, and more multimedia texts such as TED Talks, YouTube videos, podcasts, documentaries, and blogs. The rationale for centering the topic of systemic racism was a response to the social context marked by a summer of racial justice protests. The rationale for incorporating more multimodal texts was to engage diverse learning styles, maintain student interest, and provide multiple means of representation of course content. Reflecting UDL guidelines, multimodality made the content more engaging, relevant, and accessible to a broader array of students. This choice also reflects CML's emphasis on multimodal literacies.

Collecting Constructive Feedback

In the fifth design choice, we collected data from students continuously throughout the semester and used the feedback to make adjustments. As already noted, the teaching team reviewed survey responses immediately, discussed them in meetings, and adjusted course design in light of student feedback. In recorded lectures and weekly emails, the instructor shared what the teaching team had learned from each survey and what changes we would make as a result. This demonstrated to students that we cared about and were listening to their feedback.

Findings

The data indicate our five design choices helped create a virtual learning environment that increased student engagement, provided multiple entry points from different prior knowledge, and allowed students to show their understanding in multiple ways. As a result, the majority of students in the course achieved CML learning outcomes. In the following subsections, we first report on student feedback using surveys as a data source. We then report on student learning using student work as a data source. Finally, we address exceptions, limitations, and areas for improvement.

Student Feedback

In our end-of-semester course evaluation (N=147), we asked students to reflect on what aspects of the course supported their learning. As this was an open-ended question, students were not led to comment on our design choices specifically; however, we coded responses according to our five design choices. Regarding the synchronous-asynchronous balance of instruction (design choice 1), 18 students (12%) identified asynchronous options as supportive to their learning as it helped them juggle multiple responsibilities. At the same time, those who took

advantage of synchronous learning opportunities offered positive comments about them, noting it helped them "keep up with school work" and "feel more connected to my professor and my peers." Regarding the modular course structure (design choice 2), ten students (7%) mentioned it reduced anxiety and made it easier to manage their time, and four noted assignments were clearly outlined and predictable. For example, one student indicated "I like how every week is similar materials and homework. When class material changes every week and there is not the same workload, it overwhelms me." Survey responses also indicated the value of "breather weeks." Twenty-one students (14.3%) named them as a strength of our design, noting, for example, "[breather week] helps me catch up with my work, move at a pace that is comfortable for me, and helps me with my life outside of school."

While students generally appreciated that self-paced modules provided flexibility, some struggled with time management in the face of so much independence. We noticed this after the first module, when numerous assignments were submitted at the last minute and the teaching team received a wave of frantic emails from students who had not kept up with the work. To address this, we implemented a recommended pacing guide with suggested due dates for each item including a week-by-week breakdown of the readings, and activated the "self-check" feature in Moodle so that students had a visual representation of what they had completed and what was still due. Weekly announcements from the professor reiterated the recommended due dates for each assignment and reading. On balance, we believe the module structure with the recommended pacing guide created an optimal mix of flexibility and structure.

Regarding our choice to build a community of learners (design choice 3), surveys indicated that students who participated in synchronous learning opportunities appreciated the community formed within them, especially discussion sections and watch parties. Eleven students (7.5%) reported discussion sessions were helpful and should meet more often. Fourteen students (9.5%) named watch parties as helpful, noting "I was excited to watch movies with live commentary from my classmates" and "watching [movies] with the rest of the class helped me find things I could have missed in my viewing." We note that over 100 students regularly attended virtual watch parties, even though attendance was not required. These became an interactive community where students shared ideas in the chat box throughout the film, and discussed the movie in small breakout rooms immediately after watching. Our fourth design choice was to update course content to include more current and more multimodal sources. In the final course evaluation, six students (4%) mentioned multimedia texts as a strength by commenting "mixing in documentaries and podcasts that add variety and make it easier to engage with the topics" and "learning new things about the media and education through various formats such as podcasts, articles, movies, etc." Several noted the relevancy of the course to "real world issues." We received no negative comments about course content.

Student Learning

In this section we analyze student work to show evidence that students achieved desired CML learning outcomes. While exceptions will be addressed in the last subsection, students in the course overall demonstrated strong evidence of CML conceptual understanding and competencies. The meeting notes from fall 2020 indicate that all four TAs and the instructor anecdotally remarked on students' rigorous engagement with course content and the high quality of their work in comparison to previous semesters. Our analysis of student writing provides evidence that CML learning outcomes were in fact met. In this section, we use examples from student work to illustrate evidence of CML learning. The examples are grouped based on two key competencies: self-reflection on media socialization, and conceptual understanding of systemic oppression. Space limitations allows use of only a few examples for each competency; however, excerpts included is representative of the general quality of student work produced in the course.

Self-Reflection on Media Socialization

One core competency of CML is the ability to self-reflect on one's own media socialization. This requires students to conceptually understand the impacts of media representation on socialization, and to identify their own relative privilege or marginalization within social structures. For students with multiple dominant social identities (e g. white, male, heterosexual, middle/upper class, American, etc.), CML starts with the recognition of unearned privilege. We found evidence of this awareness in many student work samples. For example, one student reflected "the media helped me believe that my story was everyone's story. I'm very fortunate to be a middle-class student who went to a good high

school, and the media helped me believe this was a common thing." She went on to acknowledge "the narrative I had grown up with was inherently racist, so now I know that I have to 'unlearn' some of the biases that I grew up believing." Another student who identified as white and upper-middle class reflected:

> If I had been asked in my youth if I believed in a meritocratic America, I would have answered, "yes." The meritocracy ideal was served to me on a silver platter by my teachers and the media alike. How would I have known any different? Being born into an upper-middle-class family and attending private schools gave me the opportunity to see myself reaching upward mobility. I had multiple resources, connections, and influences that allowed me to get to where I am today. I never saw the value of this until I went to college and realized that many people did not get the same opportunities as I did.

These excerpts all demonstrate students' ability to identify and name their own privilege, critically reflect on long-held biases, and consider how media messages have shaped or influenced their views.

A second set of papers shows how students with marginalized identities questioned dominant media narratives about themselves. In one example, a student who identified as Asian American and male reflected "American media has taught people like me that the place of Asians in society is at the fringes of whiteness -- just legitimate enough to be graced with white presence, but not virtuous enough to be respected among them." Recalling his childhood in a "rich white community," he noted "without strong Asian protagonists to give us a positive image of our own ethnicity, we instead turned to the characteristics of white heroes as a model." He also identified how positive media representations had benefited him "thanks to movies like *The Farewell* and *Crazy Rich Asians*, my sister and I have been able to look at each other for the first time in our lives and go 'look, it's us. That's our culture!'"

In another example, a student who identified as Asian American and female described how "tiring" it was to be judged by "Eurocentric beauty standards" that create "the sense of *white is beautiful.*" However, she found solace on the social media platform Tiktok, where she found "different types of Asians who choose not to conform to stereotypes and share pride in Asian embodiment." She suggested media literacy helped her develop a more positive self-image:

> The way the media deforms and underrepresents me is something I will let go in the way of how I perceive myself. Instead, I will choose to stand by my people, love my culture, and myself. I am choosing to unlearn and decolonize Eurocentric beauty standards and cherish my Asiacentric ones. Media is powerful, especially to the more influential and progressive generation. Once the media portrays positive images of POC the more accepting the world can be as young girls are internalizing and deconstructing these types of messages.

These reflections from students with marginalized identities provide evidence of naming and challenging dominant media narratives, and understanding how representation impacts people in both positive and harmful ways.

A third set of students offered complex accounts of marginalization *and* privilege with regard to media representation and socialization. For example, a student who identified as white and female observed "I have been fortunate enough as a white woman to see myself reflected in various films and books throughout my lifetime." However, she realized even though her identity was well represented, she had been harmed by unrealistic beauty standards and gender roles "I unknowingly internalized the beauty standards and gender roles that films like these portrayed. Magazines and television showed me a specific ideal that girls are expected to live up to, and I desperately wanted to live up to them." In another example, a student identifying as white and female reflected on contradictory media messages about womanhood, including "the idea that strong women still change for men." She shared personal anecdotes about specific films she had seen as a child, which had shaped her ideas about womanhood, leading to disempowerment and internalized sexism. This was true even of films praised for having strong female characters, causing her to observe "movies can show a strong female role but that doesn't mean there are no embedded negative messages." These excerpts demonstrate students' ability to reflect on their media socialization, and conceptual understanding of how media messages may simultaneously support *and* undermine positive self-esteem based on one's multiple, intersecting social identities.

Taken together, these samples of student work provide evidence students developed the CML competency of self-reflection on media socialization. Even though students brought different life experiences, identities, privileges, and prior knowledge to this process, resulting in very different types of reflections, all types of students were able to meet the CML learning goal of self-reflection.

Systemic Inequality

A second core competency of CML is the conceptual understanding of systemic inequality as differentiated from interpersonal discrimination. Evidence from student work suggests, overall, students demonstrated this competency as they engaged with course material. One source students named over and over again was the *New York Times* series, "Still Separate, Still Equal" (Meatto, 2019), which examines racial segregation and unequal funding in US education through a series of articles and interactive activities. Students completed one of the articles with accompanying activities in each module. Many reported being surprised by facts about segregation and unequal funding included in these articles. One student wrote "It sucks to admit, but I actually didn't know that segregation within schools is still such a huge issue. [. . .] [The article] opened up my eyes that there was a racial divide." Another responded with this personal reflection:

> I went to elementary, middle, and high school in predominantly white districts where I was given laptops to use and bring home each day and new textbooks to read, while students I knew at the schools on the other side of town were getting my hand-me-downs. These schools getting our hand-me-downs were on the other side of town unofficially labeled as lower class and were predominately black.

These excerpts show how students responded to and engaged with new information about racial inequality in US education, even though it may have challenged prior assumptions. They show how students connected course material to their own life experiences, applying what they learned through self-reflection on their own experiences in schools.

Many demonstrated understanding of systemic inequality by critiquing the meritocracy myth – a concept introduced in the course. For example, one student wrote, "Through this course, I have learned of the meritocracy myth and have been able to apply it to my own life in discovering why in many cases I was the token person of color [in advanced classes]." Another described meritocracy as a "fabricated ideal" and observed that people with "subordinate identities typically have to work longer and harder to reach the same level of success as dominant, privileged identities." A third student wrote:

> Meritocracy is a toxic myth because if marginalized groups and classes are told that their situations in life are due to their "laziness" or lack of determination, then they will most likely blame themselves. This narrative can deprive them of their confidence and make them believe that they cannot attain upward mobility. The implementation of equal opportunities across the education system coupled with the complete eradication of the meritocracy myth is the only way to achieve equality of outcomes across social classes.

In these three excerpts, students critiqued the meritocracy myth to argue some groups are *systematically* disadvantaged by systems and structures, therefore providing evidence of conceptual understanding of systemic inequality.

These last two excerpts show students integrating multiple CML competencies to advance an independent argument or interpretation. Although such sophisticated CML understanding was not achieved across the class, it is representative of student work in the top one-third of the grade distribution for the final course paper, a summative assessment drawing on material from the full semester. In the first excerpt, a student applies their critique of meritocracy to the movie *Freedom Writers,* a quintessential urban high school genre film:

> These films [in the urban high school genre] reinforce the false belief [. . .] that individuals are poor because they lack the necessary values to achieve success. This belief does not identify the countless other barriers that these individuals have to face. Even the best teaching does not always determine

> *success in a student . . . Instead of blaming the failure of these students on poor teaching, society has to recognize the structural barriers put forth by the government, economy, and cultures that prevent these individuals from "making it" in America.*

This student not only identifies the underlying message of the film (i.e., answering what the film teaches and how, but also makes an argument about why this message matters in the larger context of systemic oppression (i.e., answering the "so what?" question). In another example of sophisticated CML understanding, a student writes:

> *People in positions of power who have the power to spread dominant narratives are often white, and also often male. This makes for dominant narratives that can be tone-deaf and/or wildly inaccurate, which contributes to problematic representations in the media that become internalized in our society.*

This student analyzed a media message by performing a contextual analysis considering the role of systemic inequality and power in shaping media production, rather than focusing on a surface-level textual analysis.

Our analysis of student work indicates learners who engaged with course content were able to achieve the desired CML learning outcomes of self-reflection on media socialization and understanding systemic oppression. A proportion of students were also able to draw independent connections between media messages and larger structures of inequality, demonstrating an even more sophisticated level of CML understanding.

Limitations and Areas for Improvement

Although the vast majority of students in the course performed well and showed evidence of CML learning, there were notable exceptions. It is important to note that we did not succeed in reaching every enrolled student. There were 26 students (14% of the class) who earned below 80% total course grade, and 13 (7%) who did not pass. Based on logs that track student activity on Moodle, we are able to confirm all 13 who did not pass exhibited a pattern of disengagement or non-participation. For example, eight of these students did not attend a single live discussion session, and an additional ten attended just two or three sessions out of five. Additionally, detailed logs from Moodle show that some did not log into the course for months, did not access the syllabus or other materials, and did not attempt any assignments.

Due to the workload demands of teaching this course and the current staffing-to-student ratio, we were unable to establish contact with every non-participating student despite attempts to do so. As a Covid-19 accommodation, every student who requested a grade of Incomplete to submit work after the semester ended was granted the option with no questions asked. However, of the four students who requested it, only two followed through with submitting assignments needed to pass the class. As such, even though we argue our five design choices increased access to student learning and provided numerous "on-ramps" for students to (re)engage the course, it was not a panacea and we did not succeed in reaching 100% of enrolled students. We note even the most effective instructional design does not guarantee the engagement of all students.

We want to note additional limitations to our course design and areas for growth. First, while we successfully incorporated multimodal texts, room for improvement remains. We originallyplanned to offer students a media production alternative to writing a paper (e.g., creating a video or podcast), however, due to workload and other challenges, we were not able to implement this option during our first redesigned semester (Fall 2020). From the UDL perspective, providing multiple means of action and expression is critical to ensuring we address students' diverse needs. From a CML perspective, media production is an important student learning outcome. For these reasons, we have integrated this option into the syllabus for Fall 2021, but we recognize it as a limitation of the Fall 2020 version discussed in this paper. Regarding our design choice to build an inclusive community of learners, this goal remains a work-in-progress. Overall, we are satisfied with the steps we took to nurture such a community in our Fall 2020 course, especially in light of the Covid-19 pandemic and the remote teaching context. Our survey results indicated students who participated in synchronous learning activities appreciated the sense of community found there. However, all teaching-team members experienced a learning curve with managing synchronous online learning spaces, and not all students

were able to be fully present in these spaces. Moreover, due to the synchronous-asynchronous design choice, many chose to complete the course asynchronously undermining attempts to build relationships and create community.

Conclusions and Implications

This paper discussed our redesign of EdFilm for a remote learning environment during the Covid-19 pandemic. Our instructional design goal was to develop students' critical media literacy (CML). With this goal, we applied UDL to inform five design choices: synchronous-asynchronous learning; modular structure; building a learning community; multimodality; and collecting student data. We argue these design choices expanded access to student learning and allowed multiple forms of engagement, representation, and action. Moreover, students who engaged with the course developed CML learning outcomes including self-reflection on media socialization and understanding of systemic inequality.

Reflecting on these findings, we identify two implications for practitioners. First, we argue for an instructional (re)design process that puts student learning goals at the center, deeply considers the impacts of social context (especially with regard to social inequalities), and applies UDL to maximize equity and access. We hope this paper clearly demonstrates how we followed these steps. It is important to emphasize our redesign did *not* merely replace in-person components of the course with parallel virtual ones. Instead, we began by clarifying the purpose of our course and its CML learning goals. We then considered the broader social context and our students' likely experiences and needs in light of this context. This meant explicitly recognizing how systemic inequalities impacted our students differently, and being mindful of how our design choices either reduced or intensified these inequalities. Only then did we work backwards from our learning goals to design instructional experiences meant to enable students to both develop and demonstrate CML competencies. We used UDL as a guide to this process, especially the three principles of engagement, representation, and action/expression.

The second implication of our study pertains to critical media literacy education. In the midst of a global pandemic that exacerbated existing social inequalities, both within the US and globally, it is essential for students to develop an understanding of social structures asymmetrically impacting different communities, and to understand the role media plays in shaping "common sense" about social issues and inequalities. Critical media literacy provides the tools to achieve this goal. As a form of social justice education, CML is urgently needed in this current historical moment. Given that CML education can be particularly empowering for marginalized students, it is essential to expand access to CML learning for this group. This is what we have attempted to do in redesigning EdFilm. We hope our experience provides insights for other instructional designers committed to social justice education.

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Preparing Educators for Culturally Responsive Teaching Through Technical Cultural Representations

Kevin M. Oliver, Angela M. Wiseman, & Cori Greer-Banks

Technology   Social Justice   Professional Development   Culturally Responsive Teaching   Culture   Study Abroad

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INSTRUCTIONAL DESIGN

This paper describes a professional development program that is designed to prepare in-service educators for culturally responsive teaching (CRT) through practice with the development of technical representations of cultural themes in an international context. Six categories of technical cultural representation are introduced with examples from both CRT literature and our program: cultural mapping, inquiring, writing, augmenting, documenting, and making. Our program features Saturday classes in spring, a two-week study abroad immersion in summer with portfolio development, and follow-up classes in fall with project sharing and lesson planning. The program has run seven times in four countries between 2011 and 2019, introducing 128 educators to CRT strategies enabled by technology while developing identities as culturally responsive educators with expanded cultural perspectives. Findings from an impact study are shared, suggesting the program has been successful in helping most educators learn new technologies and strategies for cultural representation with writing frames and global projects, in particular, being reapplied in classrooms. Some educators also noted they had increased in their understanding of culture-focused activities and themes that were more meaningful and tied into social justice issues, while others had learned to better recognize diverse cultures in their own classrooms and were modifying teaching practices to honor those perspectives and traditions. The paper concludes with design recommendations for others seeking to offer professional development in CRT.

Introduction

According to the National Center for Education Statistics (2020), the percentage of American students from Hispanic, Asian, and mixed race backgrounds will continue to increase through 2029 while the percentage of white students will decline by 17% between 2000 and 2029. A majority of students in future classrooms will be culturally and linguistically diverse. A widening gap is forming between teachers who are predominantly white and the increasing number of

minority students they serve. Research has shown a lack of "cultural synchronicity" between teachers and students can have negative effects on minority student achievement in some subjects such as math, and elevated minority behavioral referrals, with calls to better recruit a more diverse teacher pool and to better train existing educators in culturally responsive teaching (CRT) (Joshi et al., 2018; Lindsay & Hart, 2017; Wright et al., 2017). The purpose of this paper is to share the design of a unique professional development (PD) program that aims to prepare in-service educators for CRT (cidre.weebly.com), along with some preliminary evidence of classroom impact and design recommendations for others interested in similar preparation.

Culturally Responsive Teaching (CRT)

Culturally responsive teaching (CRT) is the theoretical framework underlying our program. CRT is a broad concept based on honoring and building on students' cultural assets "to make learning encounters more relevant and effective for them" (Gay, 2000, p. 29). CRT is an extension of multicultural education (Gay, 2015) which has important tenets of recognizing the importance of culture and integrating diverse perspectives into the curriculum. An important premise of equity-centered instruction, such as CRT, is the acknowledgement that children have been marginalized based on their culture, language, or identities in school settings. Therefore, CRT involves acknowledging the legitimacy of different ethnic groups to incorporate diverse content delivery, cultivating bridges between home and school experiences, using a wide variety of instructional strategies, incorporating appreciation of students own and others' heritages, and bringing multicultural resources across the curriculum (Gay, 2000).

Teachers have particular cultural biases that can affect the expectations and opportunities of children in their classrooms (Gay, 2015); therefore, the way teachers engage and support students' cultural and linguistic diversity could be considered the most important aspect of their teaching. It takes a conscious effort to understand and learn across cultures because our own interpretive lens is based on our own cultural assumptions (Hollie, 2019). For instance, it has been well documented that students are positively affected by exposure to diverse perspectives and characters in literature where they can see themselves but also gain understanding of others (Karam et. al., 2019). Furthermore, teachers' cultural biases can affect how they encourage students to participate, engage, and succeed in classroom contexts.

For teachers to consider their own biases and cultural expectations, they must reflect on their own background and cultural identities and how that impacts their interactions with students, particularly students who come from diverse backgrounds (Byrd, 2016; Haddix, 2016). Teachers must take "critical perspectives on policies and practices that may have direct impact on their lives and communities" (Ladson-Billings, 2014, p. 78). An important first step is to recognize how pedagogies are aligned with linguistic, literate, and cultural hegemony, and that white middle class students should not be the norm for how everyone should learn and communicate (Paris & Alim, 2014). The classroom research of Ladson-Billings (1995) and Gay (2000) has been foundational to how we view CRT and has provided frameworks for expansive thinking and the potential for inclusive learning (Smith, 2020).

As our world becomes more connected through technology and our classrooms more diverse, the goal is for all students to not only feel respected but also respect and engage with different cultural and linguistic backgrounds beyond their own worlds (Milner, 2010). Helping educators become interculturally competent from a global perspective is one way to integrate CRT that is inclusive and respectful in classroom settings. Deardorff (2006) refers to intercultural competences as the way that skills, attitudes, and knowledge take into account diverse cultures in classrooms. Like CRT, interculturally competent teachers support linguistic and cultural diversity, are open to diverse ways of knowing, and approach curriculum in inclusive and expansive ways (Dimitrov & Haque, 2016; Murray-Garcia & Tervalon, 2017). As with CRT, in order to develop cultural competence, teachers should understand their own cultural identities, be able to anticipate and respect that students are different, incorporate perspective-taking so that students begin to understand that people have different perspectives, and model acceptance and non-judgement for exploring diverse cultural or social orientations.

At the beginning of our PD program, global and cultural frameworks are introduced to set up opportunities for teachers (and later their students) to examine cultural differences. For example, global pathways such as the UN Sustainable Development Goals are issues faced by most countries (e.g., climate change, immigration) for which solutions (or apathy) tend to be cultural in nature and highlight differences in cultural approaches and values (Peters, 2009; UN Foundation, 2020). Also, cultural universals are items found in all countries that vary across cultures, again providing an opportunity to study cultural differences (e.g., leaders, marriage, birth and death rites, toys) (Payne & Gay, 1997). Global pathways and cultural universals can overlap with social justice issues in certain areas (e.g., inequities in education and economics; lack of access to clean water and energy in the poorest nations). Social justice issues are those where privilege and hegemony impact opportunities (Fabionar, 2020) and one's ability to participate in social and political life (Thrift & Sugarman, 2019). As with global pathways and cultural universals, social justice issues are often common across nations, but cultures differ in perspectives toward issues and the cultural products and practices they apply or fail to apply in resolving them (Cutshall, 2012).

Research demonstrates that it can be challenging for teachers to engage critically with social justice topics since they have limited time, materials, and resources alongside pressures to follow standards and scripted curricula. Our PD program aims to provide educators with experiences investigating cultural themes with social justice ties and representing those themes digitally. Afterward, they can work more effectively with their own students to elicit and honor inclusive cultural perspectives and identities while building cultural understanding.

Applied Strategies with Technology in Support of CRT

A recent review of interventions to prepare in-service educators for CRT revealed most employed role play or simulation, while only one was based on immersion (Bottiani et al., 2018). International context factors into the design of our program, providing educators with an opportunity to immerse themselves in another culture from a minority perspective, learning what it feels like to speak a different language or to hold alternative views relative to cultural themes they choose to study. To model CRT and provide training that builds on tenets of CRT (Gay, 2000) and cultural competence (Deardorff, 2006), educators in our program select a cultural theme to digitally represent with encouragement to choose themes that elevate understanding of social justice issues. For example, the third author of this paper participated in our program and chose to represent issues of inequity for the immigrant Roma people when visiting Czechia. Themes ideally tie into an educator's content area, with that theme guiding the development of artifacts (cultural representations) within a development-competence portfolio (Baumgartner, 2009) that fosters growth in techniques employed by culturally responsive educators and educator identity development. Opportunities to consider identities are further supported by allotted time for reflection on developing competencies and changes needed in teaching practice, as recommended for CRT training (Byrd, 2016).

Table 1 summarizes the six categories of technical cultural representation currently introduced in our program. This model has evolved across our seven cohorts with each testing new representations and tools. Earlier programs had a strong focus on *cultural writing* merged with media owing to our association with a National Writing Project site. *Cultural mapping* has been applied across all programs, although uses have become more focused on particular cultural themes, as well as nuanced to include a division between maps with cultural details that are simply viewed online contrasted with *cultural augmenting* in digital layers that rely on maps to enhance site-based exploration. All programs have promoted *cultural documenting* of themes on site using traditional audio and video methods with people, whereas recent programs have added support for *cultural inquiring* into data as the field of cultural analytics has emerged and *cultural making* in informal spaces as after-school makerspaces have become popularized.

Table 1

Categories of Technical Cultural Representation Introduced During Training

Categories	Descriptions
Cultural Mapping	relates to layering researched cultural information within placemarks on maps with those details shareable to others via web browsers
Cultural Inquiring	relates to the study of digital cultural resources (primary sources, popular media, data sets, social media) to answer a culture-focused question; inquiry results can be shared via cultural writing, maps, or data dashboards
Cultural Writing	relates to the use of varied writing frames (poems, travel writing, book/film reviews, timelines) to present one's own cultural identity or one's understanding of another culture
Cultural Augmenting	relates to digitally layering cultural details or perspectives over a geographically-based scene, setting, or context; can empower or give voice to persons who are not typically represented in traditional ways (markers, monuments, museums); given its geographic drivers, augmenting typically merges with mapping
Cultural Documenting	relates to the study of cultural topics by capturing authentic cultural perspectives and details directly from persons in a culture; similar to cultural inquiring but more person-based than data-based, and more likely to be represented as audio-visual stories
Cultural Making	relates to popular approaches applied commonly in after-school settings such as maker clubs and coding clubs with the potential for "made" artifacts to be reflective of culture (3D prints, games)

In the following subsections, each category is elaborated with related CRT literature, details about our general application with specific tools, and examples from author three's Roma-focused portfolio to illustrate how one cultural theme can be represented in multiple forms.

Mapping

Increasingly educators are employing digital mapping tools as a pedagogical approach for researching and representing social justice themes that might otherwise be invisible or abstract to students such as: the prevalence of colonial monuments relative to markers about indigenous people (Mercier & Rata, 2017): the connection between pineapples with ties to slavery in the West Indies and the American south (Dawson & Mitchell, 2017): the aerial comparison of settlements in South Africa highlighting the consequences of apartheid (Schoeman, 2018); the study of political maps and changing borders to understand impacts of genocide (Fitchett & Good, 2012); and the study of access to economic institutions such as banks versus pawn shops, variable by neighborhood income level (Rubel et al., 2017). Customized maps can honor students' cultural heritage as recommended in CRT (Gay, 2000), since included placemarks may not be found in more traditional forms (e.g., monuments, books).

The use of mapping tools to represent cultural themes has become more specific over iterations of our program. Initial cohorts collaboratively edited Google Maps to note any cultural elements they were noticing abroad. We shifted to more coherent Google Maps and History Pin collections that prompted educators to focus on particular themes (e.g., Finnish design economy, cultural museums, recreational opportunities in a given city). While improved, these maps still lacked focus on more critical social justice themes; hence, in current programs, participants are introduced to aforementioned examples of cultural mapping and only include a custom map in their portfolio if it helps to represent their cultural theme. For example, the third author constructed a map to represent Czech Roma genocide during World War II and current immigration of Roma from Hungary and Slovakia to Czechia (see Figure 1).

Figure 1

One Waypoint From a Personalized Google Map Conveying the Czech-Roma Story
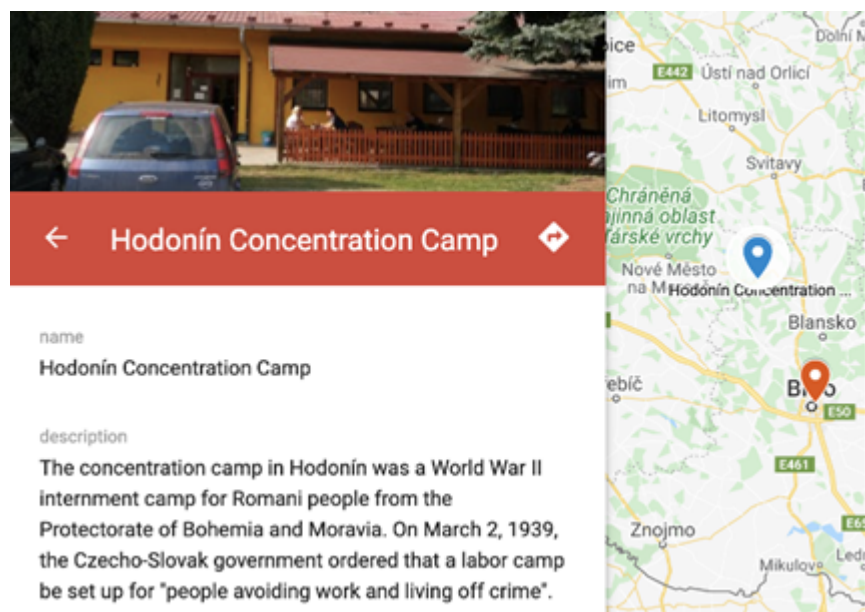
Image shows a Google Map with waypoint that when clicked opens a textual description of the Hodonin concentration camp.

Inquiring

Another effective strategy to introduce social justice issues and cultural perspectives is inquiry into primary sources, data sets, and social media, with technical representation of emerging themes. Franquiz and Salinas (2011) used inquiry into primary sources to support English development among immigrant students in the context of social justice lessons (e.g., school integration, Mexican civil rights). Students crafted identity texts and letters that illustrated their personal connections to documents. Inquiry into public data sets is supported by tools like *ArcGIS* that allow students to filter public databases, reveal inequities on maps as patterns or hot spots, and answer their own research questions. A related "geo-inquiry" process is available for students to investigate and represent issues in their local communities around which they can take some civic action (e.g., rural access to health care) (Oberle, 2020). A further opportunity to examine cultural trends is afforded by access to user posts on social media sites like Twitter and Instagram (Boy & Uitermark, 2016; Greenhalgh, 2020).

As our program is held abroad, data sets in a different language can be challenging to work with (e.g., public data about schools in Sweden, or social media posted in Czech). Typically, participants can find some resources to inquire into their themes (e.g., online news sites and exhibits, YouTube videos, tweets). We introduce content curation tools such as Wakelet or Padlet to capture and annotate related resources. The third author did not include an inquiry project in her portfolio given underserved communities like the Roma are often not reflected in formal records or popular social sites. However, other educators used Padlet to curate content on topics such as protest music in Prague during the communist occupation and Czech perspectives on green living (see Figures 2 and 3). Such inquiries can provide a lens through which we gain an understanding of diverse perspectives as recommended in CRT (Karam et al., 2019).

Figure 2

Portion of Curated Padlet on Protest Music in Prague
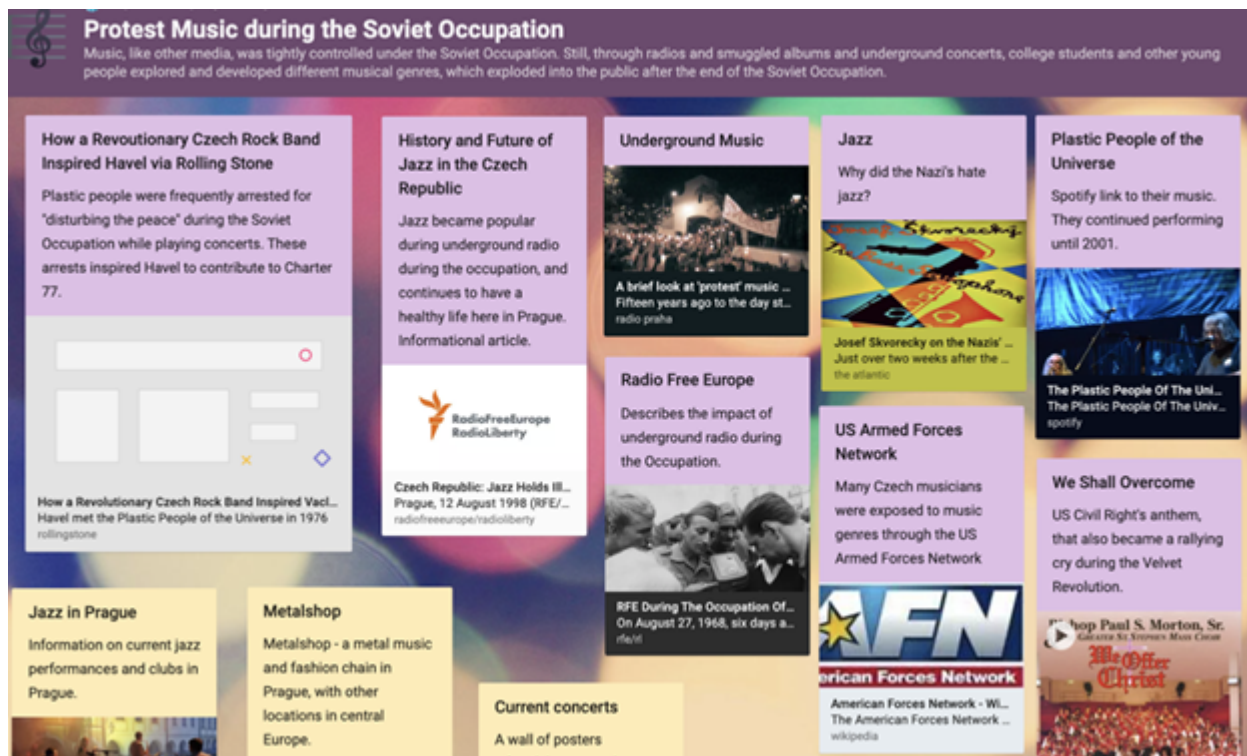
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Image shows a sample Padlet page where the student has curated a selection of web-based resources on the larger topic of "protest music during the Soviet occupation."

Figure 3

Portion of Curated Padlet on Green Living

Image shows a sample Padlet page where the student has curated a selection of web-based resources on the larger topic of "green living" in the city of Prague.

Writing

Written cultural representations are widely varied and very flexible given writing can be merged with media into multimodal representations with the potential to provide more details than text alone (e.g., Voicethreads with spoken voice and images, ArcGIS StoryMaps with images and geographic details). Educators have applied frames that invite participants to write about their own cultural identities such as identity texts applied to help immigrant youth develop writing cohesion (Daniel & Eley, 2017, p. 244); *Where I'm From Poems* used to elicit "culturally lived experience" (Certo & Beymer, 2020); and *Bio Poems* utilized to build community among teacher candidates and reflect on elements of identity underrepresented in literature (Ness, 2019). Writing frames can also guide reflections on culture during travels such as visual thinking about objects in museums and cultural sites (Yenawine, 2013), and applications of travel writing (Duffy, 2012). As culture is often reflected in books and film, preparing written book and film reviews can provide opportunities to examine and discuss cultural differences as encouraged in CRT (Corrigan, 2015; Hartley, 2006). Finally, expository notes can be written about cultural themes and added to informative timelines presenting cultural information.

In our PD programs, we have introduced and worked with all of the aforementioned writing frames and tools (e.g., poetry and travel writing, analyzing visuals in museums, writing book and film reviews, creating timelines). Writing and sharing personal poems and opinions on books, films, and travels, provides educators opportunities to feel respected within our community while building respect for diverse cultural backgrounds as recommended in CRT (Milner, 2010). Travel writing and visual analysis provides opportunities for educators to develop consciousness about their own cultural assumptions that influence how they interact with or view others who are different (Hollie, 2019).

The third author employed a number of writing frames in her portfolio to help represent the Roma people, with that writing presented in different multimodal forms. A bio poem highlighted characteristics of the Roma figure Radoslav Banga (see Figure 4), while a site-based travel writing entry in our blog shared details about the Roma people as discovered in Brno's Museum of Romani Culture (see Figure 5). A book review of *Jakob's Colors* about a half-Roma boy fleeing persecution in Austria was shared within a GoodReads group set up for our program (see Figure 6). She also wrote about key events in Roma immigration to central Europe and integrated these facts into a media-rich TimeMapper presentation (see Figure 7). Through these projects, she expanded her knowledge of cultures while developing identity as a culturally responsive educator equipped with strategies and tools to apply toward inclusive teaching.

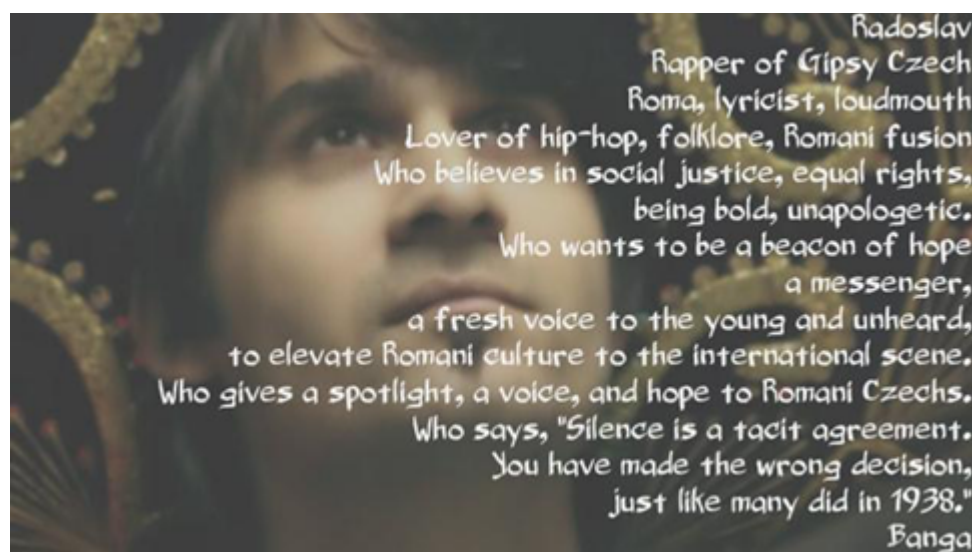**Figure 4**

Bio Poem on Radoslav Banga

Image shows a photograph of a Roma rapper Radoslav Banga, with a bio poem about the poet superimposed over the image.

Figure 5

Excerpt from Site-Based Travel Writing Piece

In the museum, I learned a lot about the history of the Romani in the Czech republic. I learned about their origins from northern India, about their early history throughout Europe, the devastation suffered during WWII, and about the social stigmas they still face today. It was illuminating- a lot of their history is similar to the discrimination and hardships African-American faced, and still face, in the United States today. Romanis also have a rich and varied culture- I highly recommend you go if you have the chance.

Image shows an excerpt from a travel writing piece written by the third author during her participation in the professional development program. The image includes photos the teacher took during a visit to a Romani museum and notes what she learned during that visit: Romani history and social stigmas.

Figure 6

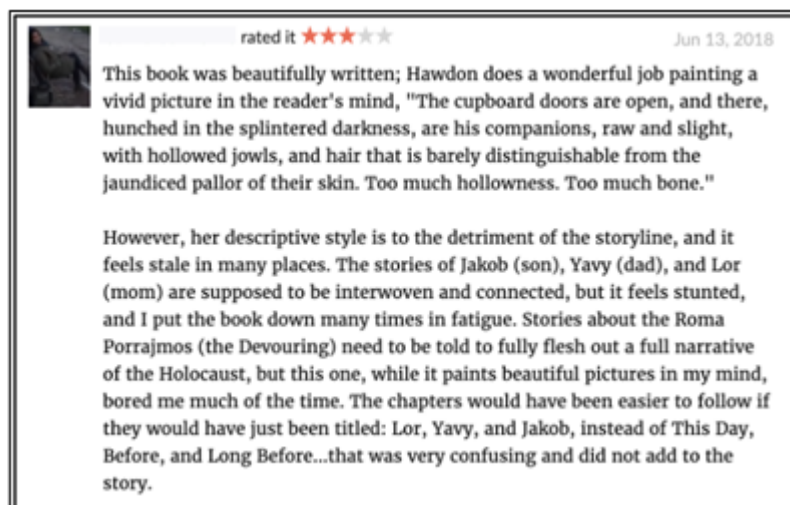*Excerpt from Review of Jakob's Colors Posted on GoodReads*

Image shows an excerpt from a book review written by the third author about the book Jakob's Colors using the GoodReads tool during her participation in the professional development program. The review includes quotations from the book and critiques its descriptive style.

Figure 7

TimeMapper Project Conveying Expository Details About Roma Immigration
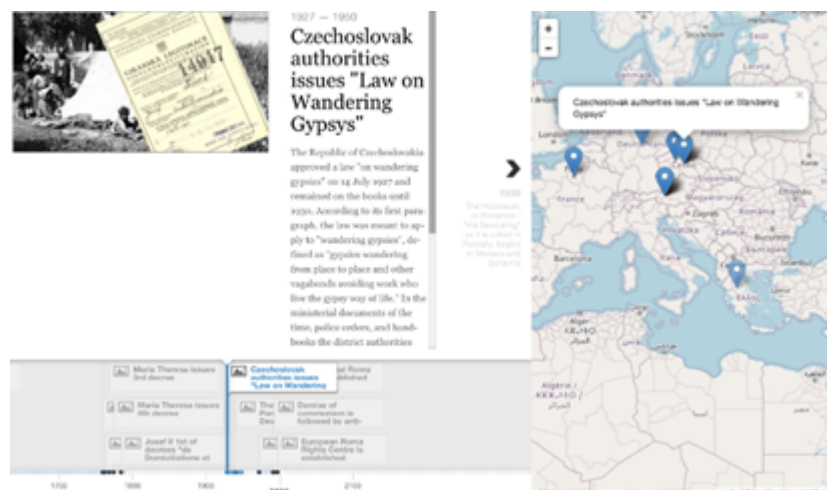
The image shows a screen shot from the third author's Time Mapper timeline project with a map of Europe, several waypoints, and one waypoint selected that relays the story of Czechoslovak authorities issuing a law against "wandering gypsys" in 1927.

Augmenting

Augmenting activities tie in well with the concept of "participatory literacies" recommended by Peck and Cretelle (2020) in which students have increased "ownership of the curriculum" and produce their own texts (p. 79). As with research methods like photo voice, augmenting gives voice to its creator who can choose what they want an audience to see, read, or hear in a space or when viewing an object like a work of art. Authoring tools for locative stories or tours also fit within this augmenting strategy as a way for creators to walk users/readers through a physical space using mobile devices that retrieve layered information at designated waypoints (augmented layers, or more static images and text). Silva et al. (2017) applied community-based locative storytelling with low income, low literacy adults who were tasked with representing personal stories using HistoryPin, noting they were able to bring visibility to "forgotten" communities (p. 8).

In our program, we introduce available tools for creating augmented layers over objects or scenes as a mechanism to layer further cultural details over the obvious reality (e.g., Overly, ARToolKit, Google ARCore). Also, a classroom-friendly option for augmenting is now provided by the popular FlipGrid tool for video-based discussion. After a user records a video, perhaps with cultural details, a QR code generated by FlipGrid allows viewers to play back that video in a particular context. For example, QR codes could be placed on a Google Map, such that when viewers get to a particular address or place in the community, the video corresponding to that part of the cultural story can be played. Alternatively, a QR code on a map could link back to an open FlipGrid topic to elicit different perspectives on a geographically-based topic from persons walking around a site (e.g., "Who does this monument represent? Who does it exclude? Scan this QR code and record your thoughts").

Since augmenting is new to our program, the third author did not apply the strategy to her portfolio. With traditional AR tools, she might have chosen a national square as a target image and layered a photo of a drawn or 3D-printed monument over the scene as a way to highlight otherwise silenced Roma contributions to that society. With FlipGrid, she might have recorded interviews with Roma persons around Prague and presented them back in their neighborhood context via QR codes on a map. Our 2019 cohort in Prague did have the opportunity to collaboratively construct a locative tour on the social justice theme of Czechia occupation and oppression between 1938 and 1989. Each educator researched a different site that told part of this story, adding it to a locative tour built with the Clio application. The [tour with eighteen stops](#) can be played back online or by walking through the sites in Prague with a mobile phone (see Figure 8). Augmenting in physical spaces is an excellent way to represent and honor the cultural assets and heritage of marginalized students whose voices have not been heard, as recommended in CRT (Bekele et al., 2018; Gay, 2000).

Figure 8

Clio Tour of Sites Related to Nazi/Communist Oppression in Prague
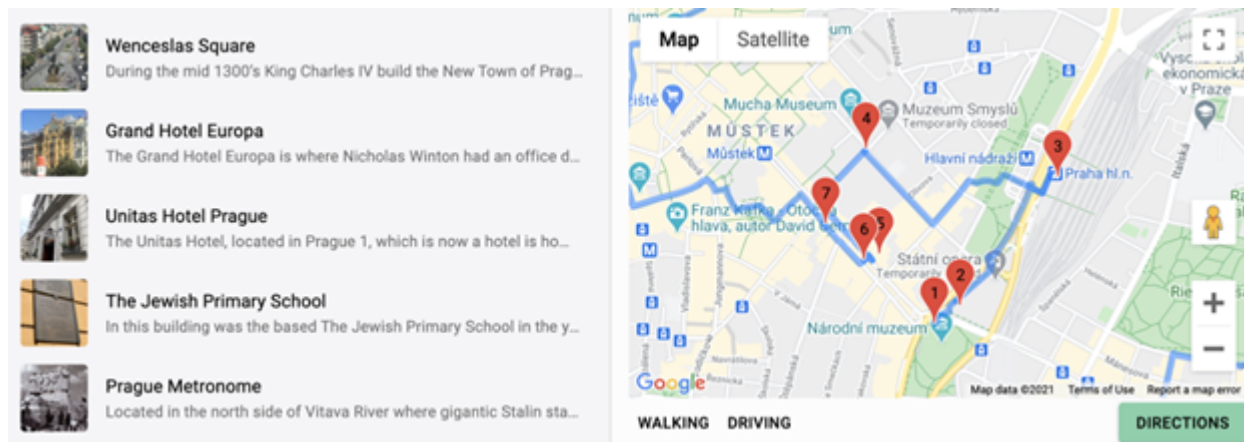
The image shows a screen shot from the tool Clio in which teachers in the professional development program co-created a walking tour to relay different stories of Nazi and Communist oppression in the Czech city of Prague. The right-hand side of the screen shot shows a map with several waypoints marked on the map, and the left-hand side of the screen shot shows a partial list of those waypoints.
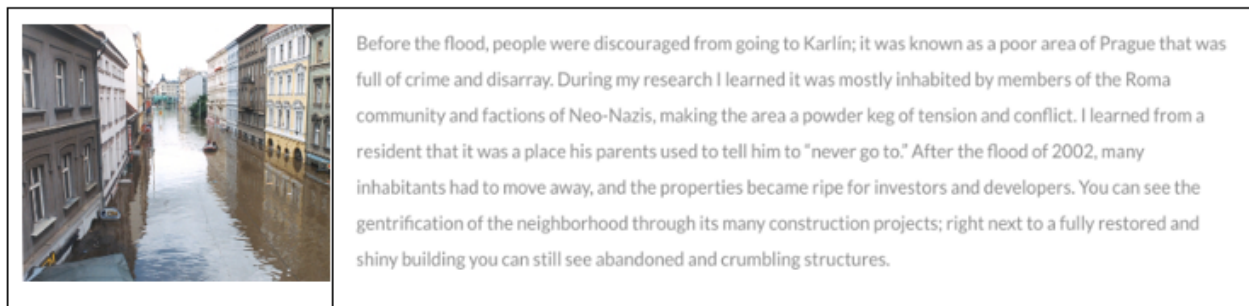
Documenting

Documenting or documentary provides a means of capturing the stories or perspectives of a cultural group directly from persons in that community. Documentary allows for bridging between home and school as recommended in CRT (Gay, 2000), with students interacting with family members to develop their own cultural identities or with diverse community members to develop understanding of cultural perspectives. Projects can be externally reflective of others, or internally self-reflective as in a study by Phelps-Ward and Laura (2016) of black adolescent girls' video logs that offered "counter narratives to dominant discourse" about their appearance (p. 807). Documentary products take many forms: videos, websites with recorded interviews, photo stories, and even locative tours if they incorporate community perspectives (Allan et al., 2018; Luchs & Miller, 2016). The documentary strategy is touted for its ability to support both the learning of process skills such as interviewing and multimedia composition (Allan et al., 2018) as well as outreach skills when students are given opportunities to share their work in the community and engage in dialogue about presented issues (Luchs & Miller, 2016).

 In our program, one documentary strategy we apply is neighborhood analysis or field research with participants making observations, taking notes and photographs, and speaking with persons in a selected area (Brewer & Solberg, 2009; Krusko, 2009). Participants write about this research in their portfolios and embed slide shows as a type of photo story. The third author conducted two neighborhood analyses in Prague and Brno in settings that were reported to have Roma populations, Karlin and Cejl, discovering Karlin had been gentrified after 2002 floods, while Cejl had an active Roma population that stood out from other areas of Czechia (see Figures 9 and 10). Another documentary strategy we apply encourages participants to join local MeetUp groups or register for AirBnb City Experiences where they can meet with persons from the host country. Participants write short duologues from these experiences to convey conversations they had that revealed cultural perspectives, then import their scripts into animating tools such as Powtoon to layer further contextual details into their stories (setting, artifacts, accents).

Figure 9

Excerpt from Karlin Neighborhood Analysis

Before the flood, people were discouraged from going to Karlín; it was known as a poor area of Prague that was full of crime and disarray. During my research I learned it was mostly inhabited by members of the Roma community and factions of Neo-Nazis, making the area a powder keg of tension and conflict. I learned from a resident that it was a place his parents used to tell him to "never go to." After the flood of 2002, many inhabitants had to move away, and the properties became ripe for investors and developers. You can see the gentrification of the neighborhood through its many construction projects; right next to a fully restored and shiny building you can still see abandoned and crumbling structures.

The image shows a screen shot from the tool Clio in which teachers in the professional development program co-created a walking tour to relay different stories of Nazi and Communist oppression in the Czech city of Prague. The right-hand side of the screen shot shows a map with several waypoints marked on the map, and the left-hand side of the screen shot shows a partial list of those waypoints.

Figure 10

Excerpt from Cejl Neighborhood Analysis

The few people I observed seemed to be locals going from one apartment to the next, or kids meeting up with their friends. I received quite a few stares as well- I imagine a black women in this neighborhood is quite out of place. However, the lack of white faces was startling- after a week in Prague I thought most everyone in this country was white! It was quite a shock to realize I had stumbled into a Roma neighborhood, and I was eager to observe all I could without being intrusive. I saw groups of people congregating on stoops, many open windows in buildings, a young mom rocking her baby, and groups of boys walking together. A young boy and a girl rode their bikes in front of me as I walked the neighborhood, curiously looking back at me from time to time. I bet they wondered what the heck I was doing there.

The image shows an excerpt from the third author's neighborhood analysis assignment in which she has presented a collage of photographs taken during her visit to the Cejl neighborhood in Brno which still has Roma residents. As a black woman, the third author's text indicates she was shocked to find a diverse neighborhood in Brno since every neighborhood she had visited in Prague was mostly white.

Making

The final strategy introduced in our program reflects popular technology-supported activities found in informal, after-school programs, lately under the term making or makerspace. Makerspaces align with some of the core tenets of CRT in leveraging shared equipment and shared expertise among a community which can be mixed-culture or mixed-generational in helping to provide expanded perspectives and skills, and in drawing on students' background interests and experiences to drive design (Gay, 2000; Sias et al., 2016). Hughes (2016) discusses a type of making called "critical making" that "concerns itself with the relationships between technologies and social life, with emphasis on their liberatory and emancipatory potential" (p. 105). This author worked with at-risk youth to construct "all about me" books reflective of cultural identity texts. To ensure after-school activities are culturally responsive, Simpkins et al. (2017) recommend including opportunities to belong, build skills, and integrate work with family and community. Murphy

(2018) relays the story of a school in Ontario where the confidence of English Language Learners was bolstered once they discovered their expertise with hand tools was valued in the makerspace with an opportunity to belong.

Maker projects can be reflective of cultural products, practices, and perspectives such as: sewing soft circuits into traditional garments or quilts; printing 3D objects reflective of cultural tools or "missing monuments" (Maloy et al., 2017); navigating Ozobots along meandering paths to reflect patterns of immigration; engineering shelters reflective of traditional housing with MakeDo kits; or coding games that are reflective of cultural stories and themes (Sandovar, 2016). Some of our earlier PD programs utilized LEGO Story Starter kits with educators conveying cultural stories by making and photographing scenes, then combining those images into comic-like strips (see Figure 11). We currently introduce cultural game coding in Scratch as a means of conveying cultural traditions (see Figure 12). While the third author did not include a maker project in her portfolio, she could have coded a Scratch pong game to conceptually convey the caretaker role of the Roma phuri dai (elder female) by tasking players to keep women and children under the care of the phuri dai in play.

Figure 11

Excerpt from LEGO Story Starter Project on a UN Sustainable Development Goal
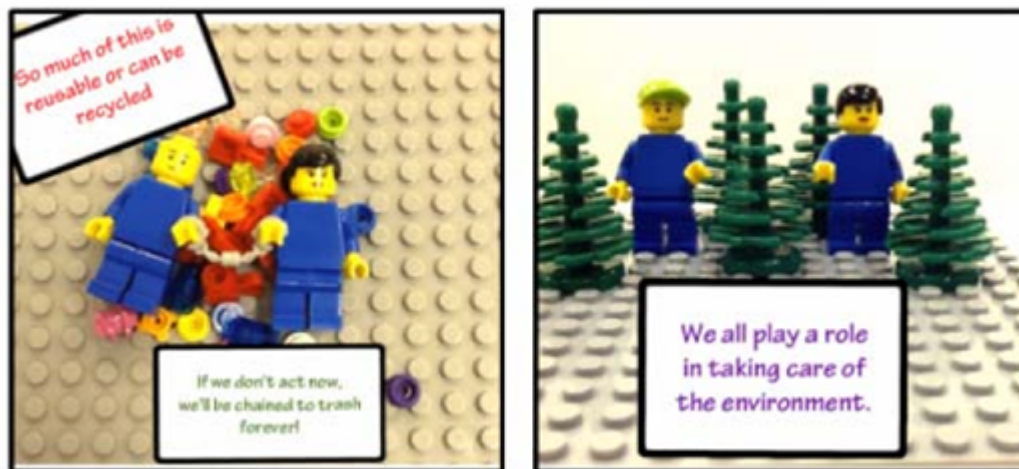
The image shows two built LEGO sets constructed with LEGO Story Starter kits, with superimposed text over the images of the sets. The first set shows LEGO characters on top of varied materials with the characters noting the items can be recycled, while the second set shows LEGO characters among trees noting everyone has a role to play in caring for the environment.

Figure 12

Scratch Game Conveying the Italian Cultural Tradition of Flag Tossing
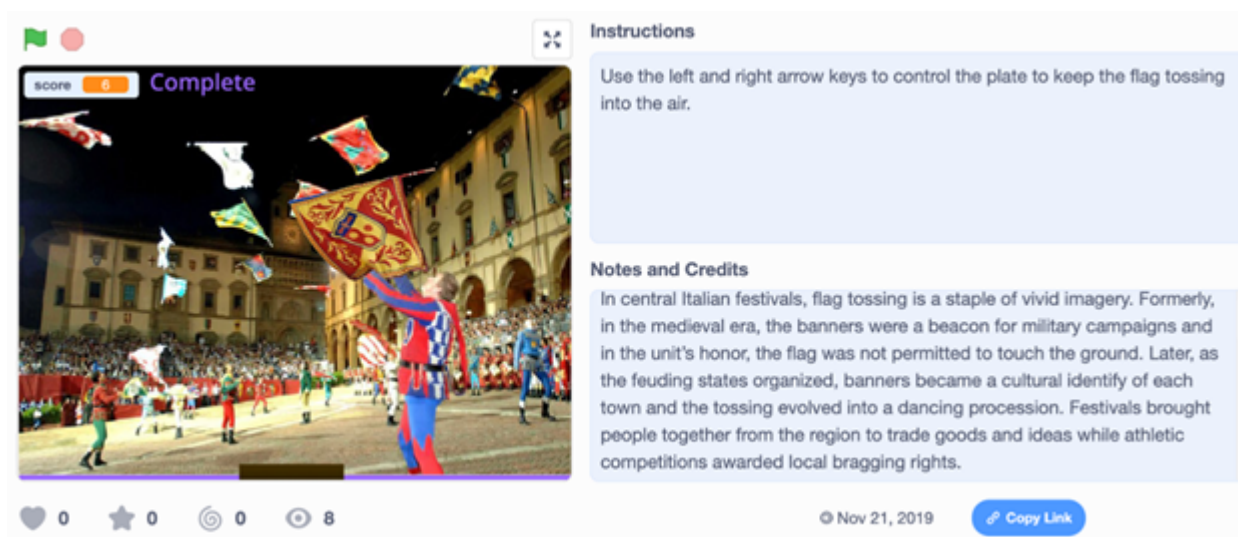
The image shows a Scratch game that conveys the Italian cultural tradition of flag tossing. The game screen includes a background photo of flag tossing, with a paddle along the bottom of the screen that is used to keep a virtual flag which bounces around in play.

Impacts on Culturally Responsive Teaching

Evaluations and targeted studies about our PD programs have informed educator growth in writing, technical, and cultural competencies (Oliver et al., 2018), as well as pedagogical approaches applied in the classroom (Oliver et al., 2019). An impact study conducted in Fall 2018 with 108 past participants of six programs provided evidence directly related to this paper regarding the generation of more culturally responsive classroom practices after PD. Forty respondents completed a survey reporting how the program had impacted their classroom practice (37% response rate). Thematic analysis was applied to open-ended questions, generating categories to illustrate common areas of impact across educators (Miles et al., 2014).

The first and largest area of impact related to changed teaching practice with new uses of technology and particular pedagogical strategies capable of drawing out cultural elements for deeper reflection and understanding. Almost all respondents cited usage of new technologies in their teaching after the programs with some apparent culturally-reflective uses (e.g., creating custom Google Maps based on classmates' Where I'm From Poems and character travels in non-fiction and historical fiction). Sixteen educators discussed applying written representations of culture that they had practiced in our programs with their own students, including *Where I'm From Poems, Bio Poems*, and travel writing. Sixteen educators across two cohorts also discussed their intent to continue offering global projects between their classroom and international classrooms that had been tested out as a required element in our program.

A second area of impact described by twelve educators related to applying the cultural frameworks introduced and researched in our program in their own classrooms with students subsequently introduced to social justice issues:

> After the program I changed some units to incorporate more global themes. My 6th grade 'belonging' unit where we used to read one novel together turned into giving the students a choice between 10 books about topics like immigration, refugees, individuals with special needs, books having a connection to the theme.

> During this program, I worked with my third-grade team to introduce the UN Sustainable Development Goals to our students. We thought our students would understand that young people can have an impact on helping solve global issues, but the inventions they drew as prototypes to help solve a global goal of their choosing surpassed our expectations. I now have concrete ways to include intercultural competencies and skills.

A third area of impact described by five educators related to growth in educator noticing or better recognizing the diverse cultures in their own classrooms and being more responsive by asking students to share and process those differences:

> My school has had an influx of 100 refugee students this school year. Participation in this program was a fantastic reminder to look for the cultural differences in a manner that elevates understanding and is allowing me to build stronger relationships with my students and their families as a result.

> The program impacted me as a teacher because I was inspired to learn more about my students' cultures and backgrounds. As a Language Arts teacher, I was able to bring diverse texts into my lessons and give more opportunities for students to share about their unique cultures.

> I implemented time during morning meetings to allow 'student stories.' . . . during their interactions with each other they are becoming more curious of each other's cultures versus seeing each other as being different and therefore a threat . . .

Design Recommendations

The design of our program has shifted across seven iterations in a manner that better supports enhanced practice with CRT strategies enabled by technology. We offer the following design recommendations for similar CRT training programs:

- Encourage in-depth inquiry into cultural themes that tie into educator content areas (e.g., an art educator developing projects reflective of art during the Weimar period). Require educators to reflect beyond "cultural celebration" (highlighting Weimar art styles) to also address more political "issues of power and equity" that underlie systemic racism and oppression (looming Nazi/nationalist restrictions on Weimar-related creativity). Encourage educators to engage critically with the curriculum (Paris & Alim, 2014), consistent with appropriately focused, culturally responsive pedagogy (Sleeter, 2011).
- Pair depth of inquiry into cultural themes with breadth in options for technically representing those themes. As shown, a single theme like Roma inequity can be represented using varied strategies (writing, inquiring, mapping, etc.), and having options ensures characteristics of a given theme can be captured while expanding educator tool sets to flexibly empower students of diverse abilities and backgrounds. As reported by Brown and Crippen (2016), educators may better understand the purpose of CRT when evaluating exemplars and looking for contextually-appropriate "leverage points in their classrooms" (p. 488). Ultimately, intercultural competence can be developed around the need for and the means of providing inclusive approaches in the classroom (Dmitrov & Haque, 2016; Murray-Garcia & Tervalon, 2017).
- Build time into PD for sharing projects to give educators exposure to multiple themes and technical modes of representation, as well as opportunities to critically discuss implications for practice. Lopez and Bursztyn (2013) note that cultural responsiveness training must move beyond cultural knowledge to also encourage critical thinking about how "human diversity" influences values, beliefs, and learning (p. 218). Bookend travels with advanced classes to learn tools for representation, and with follow-up classes to share favorite projects and lesson plans that indicate how educators intend to apply the modes.
- Weave inter-cultural interactions into PD as a means of building greater cultural understanding and informing themes. We have supported interactions through specific projects (documentary neighborhood analysis, global projects) and travel (tours and seminars at cultural sites, participation in local groups and experiences). Prater and Devereaux (2009) recommend culturally responsive training include not only opportunities for self-reflection but also opportunities to study those who are different through such means as interviews. Such connections are important to construct knowledge of diverse cultures and intercultural understanding (Deardorff, 2016).

In conclusion, we advocate for PD opportunities that train educators in the noted CRT strategies for connecting with and representing cultural themes. Ideally, opportunities will be immersive in communities or international locales that are

rich in culture and differ from the educator's own background in allowing one to experience difference and develop cultural understanding and competence to empathetically teach increasingly diverse students.

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Learning in Diverse Educational Contexts: Bringing Social Justice when Designing Culturally Rich Learning Experiences in Brazil

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Education   Social Justice   Learning Design

The research study aims to understand how culturally rich learning experiences in urban settings can change people's perceptions towards social justice. The methodology used is known as research-training in cyberculture. The study takes place in the context of a course offered to in-service teachers by the Federal Institute of Rio de Janeiro in Brazil. Fifty-two educators participated in this study. The educators' narratives described opportunities to interact with local culture and art, as well as practices that highlight cultural diversity and ways to promote social justice.

Introduction

An educational project that combined educational technology, communication, culture, and art was carried out in the Metropolitan region of Rio de Janeiro, known as the Baixada Fluminense in Brazil. We used a combination of social theory, urban education, and technology to combat systems that promote or perpetuate injustice and inequality. The goal was to deconstruct the everyday discourse that cultural life was non-existent in Baixada Fluminense, Brazil. The project also addressed educators' perceived lack of access to the cultural assets in Baixada Fluminense, particularly in the city's periphery. We aimed to foster interaction and mapping of culture and arts in the Baixada Fluminense, as well as to encourage educational practices that emphasize the diversity of these communities. To achieve these goals, we provided educators' experiences in local cultural and artistic spaces and access to a diverse range of cultural groups living in the city.

This study focused on how learning design can be used as a strategy for opposing and/or changing systems that frequently promote or perpetuate social injustice and inequality. Learning designers have a responsibility as agents of

change to prioritize the public interest and a sense of civic responsibility in their work (Yusop & Correia, 2014). The following research question guided the study:

What kinds of awareness do educators who create culturally rich learning experiences cultivate to promote social justice in the intersection of urbanism, technology, culture, and the arts?

Social Justice Education

This research is based on the work of Paulo Freire, a Brazilian-born educator and social justice advocate. Freire (2018) saw education as a way to problematize the world, engage in constant dialogue, and raise awareness for understanding the world around us. Freire (2004) advocated for education for liberation and social justice in the face of oppression. He proposed a dialogical, emancipatory, critical, reflexive, and ethical education in opposition to what he referred to as "banking education" (Freire, 2018). A banking education perspective assumes that teachers deposit knowledge to passive students who are assumed to be disconnected from their realities. Students are seen as "a person . . . merely in the world, not with the world or with others; the individual is spectator, not re-creator" (Freire, 2018, p. 75).

In contrast, Freire (1973) proposed that students construct knowledge through confrontation with its reality, making sense of their lived experiences. He encouraged a curious attitude toward the world, always seeking understanding and aiming to develop critical consciousness. Freire (2018) proposed that people are in a relationship with the world to change the dynamics of power and inequality. Understanding this relationship and taking action on it are at the root of critical consciousness. To achieve this, he advocated a reflexive, dialogic, conscientious, and libertarian education.

Freire's ideas demand we recognize each person's value in society regardless of profession or level of study, because there is no hierarchy of knowledge and culture. If we fight against oppression and favor equality, we can build a just society. Many others have taken up and expanded on Freire's ideas. For example, Adams (2016) used these ideas to develop a pedagogy for social justice education. Adams (2016) explained this pedagogy as "experiential, participant-centered, inclusive, collaborative, and democratic" (p. 29). Importantly, like Freire's critical pedagogy, Adams' (2016) approach focuses on the ways our social positions are related to larger systems that reproduce inequality.

Social justice education is a concept that expresses the desire and the commitment of education to social justice and equitable relationships in the face of oppression and exclusion (Adams, 2016). Therefore, learning experiences based on this approach invest in diversity, individual experiences, anti-discrimination education, various identities and cultural background, inclusion, and community.

Hackman and Rauscher (2004) highlighted five pedagogical components for educators to consider when implementing social justice education: content mastery, critical thinking tools, self-reflection tools, social change tools, and tools for attending to multicultural group dynamics. Each of these components is essential for students to connect information to "larger social and cultural frameworks," engage in critical thinking, include multiple perspectives, and apply a critical, systemic analysis to issues (Hackman and Rauscher, 2004, p. 114-115).

For this project, we used insights from critical and social justice pedagogy to design the learning experiences, also remembering Bell's (2016) reflection that "social justice is both a goal and a process" (p. 3).

Methodology: Research-Training in Cyberculture

Research-training in cyberculture (Santos, 2019) is an epistemological fusion of multi-referential theories (Ardoino, 1998), research on everyday life in schools (Alves, 2011), and cyberculture (Lévy, 1999). One of the main inspirations in the development of this methodology was Josso's (2004) research-training methodology which developed a theory of education based on autobiographical approaches. An autobiographical approach involves participants creating narratives about themselves, their educational and research processes, culture, identities, and territories, or narratives on training-related subjects that they are comfortable approaching.

The research-training methodology is rooted in the work of Paulo Freire. Josso (2009) stated, "[Freire's] method of analyzing discourses and silences as a source of essential realities . . . inspired the development of my method of analyzing and interpreting written narratives" (p. 138). The research-training method is based on life stories as a project of knowledge and education, with the narrative of life experiences and education serving as the methodological path (Josso, 2009). The goal is to understand educational processes that are affective and reflexive in nature for students. Therefore, narratives are fundamental when analyzing data. The theoretical and methodological components of this study are consistent with the issues addressed in the work.

Research-training is a methodology designed to bridge the gap between educational processes and scientific investigation while taking cyberculture into account. "Cyberculture" refers to the set of techniques (material and intellectual), practices, attitudes, ways of thinking, and values that develop together with the growth of cyberspace (Lévy, 1999, p. 17). Cyberculture is a contemporary culture shaped by digital technologies (Santos, 2019). This is similar to a participatory research model that does not separate teaching and learning from research. According to research-training in cyberculture, the links between teaching practices and research are robust because research occurs concurrently with our educational practices. This method investigates teaching practices, as well as interactions with participants, particularly when using digital technologies.

Participants of the Study

The study took place in the context of the course "Teaching Training for Communication, Culture, and Art," offered online by the Federal Institute of Rio de Janeiro on the Belford Roxo campus in Brazil. This course was offered by the first author of this study. Students enrolled in this course, primarily from Baixada Fluminense in Rio de Janeiro, Brazil, participated in the study. They were primarily in-service teachers, but they also included school principals and coordinators. Participants came from a variety of backgrounds and ranged in age from 23 to 58 years old. This study included a total of 52 participants.

Instead of hand-picking study participants, we invited all students enrolled in the course to participate in the research. When they agreed to participate, they signed an informed consent form acknowledging the study's purpose and any associated benefits or drawbacks. They consented to the analysis of artifacts from their practices, as well as, their reflections on the course and projects.

Context of the Study

The Baixada Fluminense has a population of about three million people and is located on the outskirts of Rio de Janeiro, Brazil. Baixada Fluminense is a geographical as well as a political designation. In terms of a geographical classification, it consists of thirteen municipalities (Sebrae, 2016) in the northwestern part of Rio de Janeiro that comprise its metropolitan region. These municipalities all share a lack of urban infrastructure, low levels of education among their residents, and high levels of violence and poverty.

The urban setting for this research was the municipality of Belford Roxo in Rio de Janeiro. Almost 40% of the Belford Roxo population survives on monthly incomes of up to half the minimum wage per person (Almeida, 2018). Belford Roxo is characterized by high levels of violence and inadequate basic sanitation (Almeida, 2018). The region is plagued with poverty and social and racial injustice. The researchers were well aware of these ongoing and long-standing issues of systemic injustice and oppression.

Learning Experiences

From March 5, 2018, to June 15, 2019, three editions of the course were offered every six months. During the first two editions of the course, we conducted a pilot study with a different group of participants. The data for this study emerged from participants in the third edition of the course. The course was created in the learning management system Moodle, and was based on theories and principles of online education (Martins et al., 2020). The course also included face-to-face sessions at the Federal Institute of Rio de Janeiro's Belford Roxo campus, as well as field

activities in the cities of Rio de Janeiro, Nilópolis, São João de Meriti, and Mesquita. The course required a total of 162 contact hours (see Table 1 for details on course topics and assignments).

The educational design used a variety of activities and resources (e.g., videos, images, audios, texts, comics, animations, group and individual collaborative activities) to provide as many learning channels as possible and to make the class as multimodal as possible. Multiple learning channels and modes of expression are critical for prioritizing all learning preferences with various formats and media. Students selected how they wanted to develop their assignments/products and the perspective they wanted to take.

We developed evaluations using a variety of techniques for each topic and content to continuously measure the process, while observing learning progress and student engagement. We documented this process in Google sheets and shared grades with the students weekly. As a result, students could track their progress and engage in extracurricular activities to improve their grades.

Previous editions of the course informed and improved our course assessment design, including making it more accessible, using appropriate interfaces for people with disabilities, implementing more clear and regular communications, and changing the teaching material to a more accessible format. In response to the needs of the students, we developed a learner-friendly course by revising the course objectives and adding opportunities for experiential learning.

Procedures

The overall research, design, and implementation process followed four integrated stages, or procedures. These are described below.

Stage 1: Teaching dilemmas: Dilemmas can arise from the relationship with students, as well as, the tensions of curricular practices, political processes, and concerns about current events (Santos, 2019). We devised research questions, and then transformed these questions into educational processes and research actions.

Stage 2: Research practices: The researcher's methods and means (procedures) developed to raise notions to better understand the research phenomena (Ardoino, 2003). We then designed the research and educational practices for the project based (e.g., classes, courses, and trainings).

Stage 3: Emergence of the data: Face-to-face and online conversations, pedagogical practices, and the assignments/productions for the course were used as data sources. Participants produced narratives using text, images, sounds, and audiovisuals across the virtual learning environment, learning diaries, group activities, and other evaluation types (Santos, 2019). Narratives emerged from dialogues in digital platforms such as forums, chats, wikis, collective writing blogs, applications, and many others that promote dialogue, collaboration, and a sense of community and belonging (Chatterjee & Correia, 2020).

Stage 4: Conversation with data (analysis procedures): We created meanings from the data that related to our involvement with the research and our goals. These meanings emerged from our analytical lenses and approaches while analyzing the data from the practice, the field experiences, and the students' narratives.

Learning experiences were created to promote reflections integrating social technology, culture, communication, and art in education. It was critical for educators to recognize the importance of incorporating the relationship between education and urban settings into their educational proposals to promote liberation and social justice. Through training and investigative strategies, we aimed to support the development of this critical understanding (see Table 1).

Table 1

Training and Investigative Strategies

Topic	Tools	Assignments	Social justice education concepts
Online education	Moodle	Reflections about preparing classes using the Google Arts & Culture application.	We encouraged participants' inquisitive attitudes and the connections between arts, culture, and technologies.
Pedagogic knowledge	Moodle	Discussion on "How can we think of pedagogical practices across cities?"	We supported the dialogical process to change dynamics of power, social systems, collective problems, and inequality in the students' realities.
Teaching experiences 1	Blog micronarrativasurbanas. wordpress.com	Collaborative writing about life in Baixada Fluminense and ways to develop a sense of community.	We promoted the understanding of the world that surrounds students to develop critical consciousness.
Teaching experiences 2	Google My Maps	Curatorship and collaborative map of educational webs in the communities of Baixada Fluminense.	We inspired emancipatory and reflexive education to build communities of practice.
Final communication, culture, and art seminar	Communities of Baixada Fluminense	Educational intervention in the city focused on communication, culture, and art (experiential).	We motivated students to be agents of change and recreate the world with a sense of civic responsibility.

Major Findings

Cities belong to everyone, but not everyone feels at home in them. Critical pedagogy is required to support social equity in the context of a lack of public in poor regions like Baixada Fluminense to create, maintain, and access cultural and artistic social goods. The narratives of study participants Rosangela, Renata, Silvio, Mariana, and Fernanda (pseudonyms) are reflected in the following paragraphs. We italicized parts of the quote to emphasize the sections where the participant narratives promote social justice concepts.

Rosangela's narrative about the Google Arts & Culture application was born in a discussion forum. We questioned how educators and teachers could use this application, which includes cultural and artistic spaces, to create classes.

> Rosangela on March 29th, 2019 opined that, cyberculture or cyberspace helps us learn. Through virtual environments such as the Google Arts & Culture app, we can interact knowing different articles to add to our "knowledge of the world." (. . .) I think of a non-traditional class, where the student would re-read Pop Art's work and seek to trace the same technique of the Lichtenstein movement. It will bring art into their daily lives, squares, and houses, as well as a specific place that the individual wishes to represent.

In Rosangela's narrative, we highlighted the words "knowledge of the world" as a fundamental expression. Other participants also reflected on this fundamental expression. For example, Rosangela created an activity that related students' knowledge with their daily lives through neighborhood squares, houses, or other places. Fernanda offered ways to rethink pedagogical practices in the city, stating, "*Taking into account the experience of the people*, in what world they are living and from there develop joint action methods, leading them to know and *enjoy the city where they live*."

From these narratives we observed what Freire (2018) calls "awareness of reality" (p. 107), meaning the awareness that originated from the deepening of reality. A theme emerged from this triangulation between experience in the research field, participants' narrative, and theoretical framework: *the conscious teaching that values the students' reality, as it encourages using students' contexts as the starting point.*

The applications used, such as Google Arts & Culture, have not led to realities close to the participants' experiences. Instead, these applications drove them to the museums of the world, which were a distant representation for many students who lived in the state of Rio de Janeiro, Brazil. As a result, we decided to create a space related to the students' realities, mapping art, culture, communication, and other educational spaces where participants lived and worked. We included educational spaces in the Baixada Fluminense in a collaborative map on Google My Maps in

topics: Teaching Experiences 1 and 2. The objective was to disseminate knowledge about relevant spaces in a territory discredited by a large part of the population, which has a stigma that it does not "produce culture" or that culture is the "culture of violence."

Participants in this study mapped twenty-five points of cultural relevance that they visited using photos, descriptions, and educational proposals (e.g., community libraries, theaters, museums, cultural centers, murals, schools, and coworking spaces) (Figure 1).

Figure 1

Screenshot of a Micronarrative Produced by One of the Study Participants (In Portuguese)
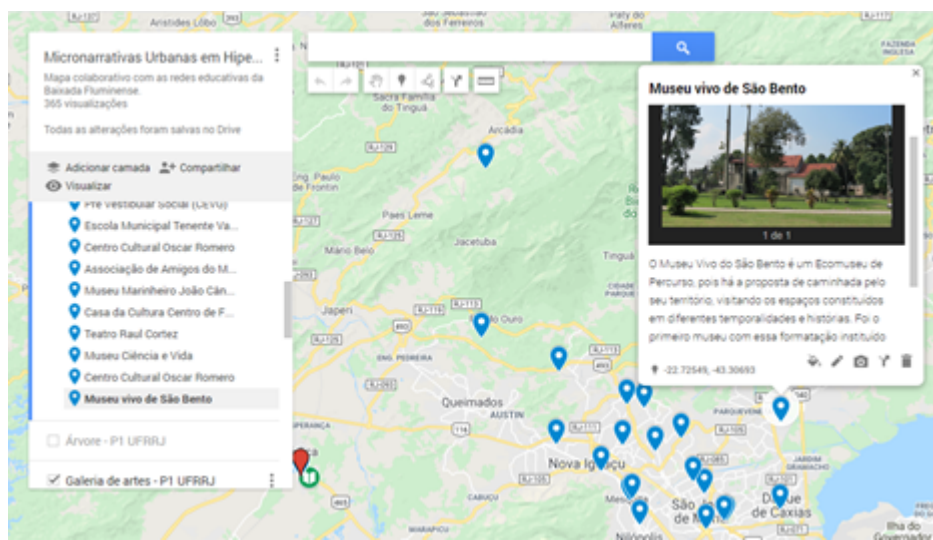
Screenshot of Micronarratives

Their perceptions as educators on the value of the diverse cultural and artistic expressions in Baixada Fluminense changed as a result of the technology-mediated experiences. Faced with this scenario, Renata reflects:

> *Renata on May 16th, 2019 opined that, it is important to think about educational practices around the city. It is a way to go deeper when it comes to contextualizing the curriculum to the reality of each student; to bring more meaning to education; to remember that culture is the way we live and, thus, to value – instead of erasing or underestimating – the students' daily experiences. (. . .) Through this perspective, one is more likely to think that the movement is already here (it is just not widely disseminated) than to accept what is frequently believed that "Baixada has nothing," "Baixada has no culture, has no museums, etc." (. . .) Even today, teaching food and nutrients, I used the neighborhood cafeterias and what they offer to contextualize the local food culture (when I proposed that it be a local analysis, the students already thought it was Brazil or Rio de Janeiro. And, to their surprise, I stressed that the place would be Parque Alian and that we would think about our experiences because our neighborhood also has its culture).*

A rich narrative addressing multiple themes, such as "contextualizing the curriculum to the reality of each student," "bringing more meaning to education," "remembering that culture is the way one lives and, thus, valuing – instead of erasing or underestimating – the students' daily experiences" was identified. It focuses our attention on exemplifying conscious teaching that values the students' realities, especially when the participant includes an example of an activity she performed with students to "contextualize the local cuisine." Similarly, Rosangela applies the activity to students' daily lives, squares, houses, and facts. We devised activities to value the urban settings in which the research was conducted..

We believe that engaging in dialogue with different urban settings allows us to reflect on their situationality. As Freire (2018) points out, people are beings "in a situation" (p. 109), rooted in time-space, which mark them and which they also

mark. They tend to reflect on their own situationality to the point where they are dismayed by it and act on it. Silvio's narrative below helped us understand how to reflect on the inclusion of urban settings when developing pedagogical actions.

> *Silvio on May 8th, 2019 opined that, a library, a square, a corner, an irregular football field, are places in which we can transcend the appearances of these urban objects and, yes, seek the essence of these objects and to understand the different meanings that each social group is appropriating and assigning new roles. From that, I believe that we can develop new pedagogical practices.*

In seeking to understand the meanings that each social group attributes to urban spaces, Silvio opens the door for us to consider another theme: *the problematizing existence that changes the world*. According to Freire (2018), "a critical analysis of a significant existential dimension makes possible a new, critical attitude towards the limit-situations. The perception and comprehension of reality are rectified and acquire new depth" (p. 104). If we consider education to be a means of promoting reflection, criticism, problematization, and social change, we must insist on equitable learning and similar opportunities for all students.

> *Mariana on May 17th, 2019 opined that, the use of this type of technology that allows the insertion of "points" on the map shows us how much we can be protagonists of our own experiences. As a result, we can modify teaching practices, both in the places where the classes we teach are held and introduce new spaces to our students. When I read Paulo Freire's (2004) assertion that "the city is culture, it is creation, not only for what we do in it and for it, for what we create in it and with it," it reaffirms the importance of these outside educational spaces. Having us to play a critical role in the urban environment.*

When we consider the possibility of intervening in urban settings, we articulate as citizens our actions that will bring about positive change. Citizens must identify with their surroundings and neighborhoods in order for such change to occur. This identification is important for the meaning-making process and is required for people to feel like they belong to a collective patrimony. By employing educational approaches that ensure all students have equal access to a high-quality education. According to Bell (2016), social justice education can be divided into three categories: social responsibility, student empowerment, and equitable resource distribution. "All three of these goals seek to help students become agents of their education as well as active, powerful, solution-oriented members of their communities" (Hackman and Rauscher, 2004, p. 114).

People must be aware of the oppression brought about by their social class, gender, race, and intersection. To understand how perverse logic is (systems of power and privilege) to act for structural changes in their realities (educational, work, and social environment, neighborhoods, and cities) empowering and inclusive places, we must look critically through an intersectional lens. Educators must band together in this fight, joining forces to combat oppression. As Freire (1998) explains:

> *The educator with a democratic vision or posture cannot avoid in his teaching praxis insisting on the critical capacity, curiosity, and autonomy of the learner. (. . .) It's exactly in this sense that to teach cannot be reduced to a superficial or externalized contact with the object or its content but extends to the production of the conditions in which critical learning is possible (p.33).*

It is necessary to join this discussion and understand the need for experiential learning and not address issues superficially. Thus, we intend to present our experiences and reflect on how we *hope for a world with social justice*. "Hope" defined by Freire (2018) does not mean "sit and wait," but instead "fight for hope." "Hope, however, does not consist in crossing one's arms and waiting. As long as I fight, I am moved by hope; and if I fight with hope, then I can wait" (p. 92). Below are two narratives of participants who have given us hope. We begin with Fernanda's statement, as follows:

> *Fernanda on May 16th, 2019 made a statement that, For a long time in my life, I always looked for resources outside or far from where I live because I believe that there were two parallel worlds; one the world "outside the Baixada" and another the "Baixada and its communities." Throughout this course, I*

started to think: "Why not here?" "Everything we produce here is also culture; there are things here that I consider art too." We need to know more about the Baixada Fluminense by being observers and creators of our culture and art. There is a world around us that constitutes what we are and what we will be.

Based on Fernanda's narrative, we conclude that the change of perspective on the territory is possible through a training process. We can hope for a world with social justice, and education is one of the biggest agents in this transformation. In this regard, we present the intervention in the city, developed as coursework.

Mariana and Renata on May 31st, 2019 opined that, the project aims to hold an exhibition, sale, and dialogue fair. (. . .) CRIAS from BXD opens space for artisans' creations from Baixada Fluminense and addresses entrepreneurship, creative economy, women's empowerment, and conscious consumption. The Baixada has a reputation for being a dangerous neighborhood with few recreational and cultural opportunities. We think about giving space and a voice to people [who] are protagonists of their stories, and who will tell them to everyone. When we gather in one place, women who have decided to work on their own creations, we are defying the capitalist logic of production. Even today, women are made invisible in many work environments, and their work is still seen as inferior. Deciding to live off an income from what you do is a tremendous political act (. . .).

Creative economy, invisible women, autonomy, women's empowerment, conscious consumption, a political act, resistance, Baixada Fluminense´s crime, and poverty rates are some of the topics addressed by Mariana and Renata. The narratives relate to the importance of cultural spaces as educational vectors to reverberate the experience in and of the city, in search for a more just and plural city, in which everyone can exercise their citizenship, fight against oppression, and effectively experience their right to the city with hope for a world with social justice.

Table 2 shows an overview of the major findings. Participants' narratives are connected to the emerging themes and Freire's direct quotes.

Table 2

Major Findings Summary

	Emerging theme	Freire's quote	Participants' narrative
The conscious teaching values the students' reality, as it encourages using students' contexts as the starting point.	Thematic investigation: "a common striving towards awareness of reality and towards self-awareness, which makes this investigation a starting point for the educational process or for cultural action of a liberating character" (Freire, 2018, p. 107).	"It will bring art into their daily lives, squares, and houses, as well as a specific place that the individual wishes to represent" (Rosangela, 2019). "Taking into account the experience of the people, in what world they are living and from there develop joint action methods, leading them to know and enjoy the city where they live" (Fernanda, 2019).	
	Problematizing an existence that changes the world	"The educator with a democratic vision or posture cannot avoid in his teaching praxis insisting on the critical capacity, curiosity, and autonomy of the learner. (. . .) It's exactly in this sense that to teach cannot be reduced to a superficial or externalized contact with the object or its content but extends to the production of the conditions in which critical learning is possible" (Freire, 1998, p.33).	"When I proposed that it be a local analysis, the students already thought it was Brazil or Rio de Janeiro. And, to their surprise, I stressed that the place would be Parque Alian and that we would think about our experiences because our neighborhood also has its culture" (Renata, 2019).
	Hope for a world with social justice	"Hope, however, does not consist in crossing one's arms and waiting. As long as I fight, I am moved by hope; and if I fight with hope, then I can wait" (Freire, 2018, p. 92).	"CRIAS from BXD opens space for artisans' creations from Baixada Fluminense and addresses entrepreneurship, creative economy, women's empowerment, and conscious consumption. (. . .) When we gather in one place,

Emerging theme	Freire's quote	Participants' narrative
		women who have decided to work with their own creations, we are defying the capitalist logic of production. Deciding to live off an income from what you do is a tremendous political act" (Renata and Mariana, 2019).

We recalled the study question "what forms of awareness educators who design culturally rich learning experiences develop to promote social justice in the interface with urbanism, technology, culture, and the arts?" to connect the question, findings, and conclusions. The educators present narratives related to the following topics: awareness of the situation, contextualization of the curriculum to the student's realities, bringing more meaning to education, relationship between culture, arts and social justice, students' empowerment, reflections on gender, social inequalities, consumption, women's position in society, and political acts. In Table 2, we relate these forms of awareness with Paulo Freire's studies and highlight the three subsumption notions that became most significant for the researchers.

Conclusion

In a community like Baixada Fluminense where everything seems missing (e.g., inadequate basic sanitation and poverty), our participants' narratives provided an alternative perspective. In fact, they showed the opposite. Their narratives showed Baixada Fluminense people's creativity, cultural richness, mobilization, critical sense, exchange, determination, willingness, sharing, emotion, and many other positive traits and actions. Baixada Fluminense became a space that inspires, rather than a space that was lacking. The educators' narratives express their sense of belonging to the Baixada Fluminense communities, their dedication to the collective, and the need to learn how to reinvent urban settings capable of transforming their citizens.

This research study was critical in dispelling cultural myths and contributing to culturally rich learning experiences that recognized marginalized neighborhoods as cultural and historical epicenters. We created activities to value the spaces in which the research was conducted. They included the discussion on pedagogical practices across cities, the collaborative writing about life in Baixada Fluminense, ways to develop a sense of community, a collaborative map of educational webs in the communities of Baixada Fluminense, and the educational intervention in the city focused on communication, culture, and art. We appreciated the importance of citizenship to transform spaces, change perceptions, and critical thinking about reality to pursue positive change and social justice. One of the intents of this study was to expose experiences in urban communities, especially in diverse educational contexts with artistic installations, institutional memories, cultural centers, and recognize culture as the result of history and social movements.

The methodology used in this study, research-training in cyberculture, enabled participants to share their pedagogical practices and supported the emergence of three major themes: *conscious teaching to value the students' realities and surroundings*, *problematizing existence that changes the world* and *the hope for a world more just*. These themes were developed based on the integration of social justice education literature, the experiences during the field research, and students' narratives.

We believe that the extended experience (one semester and 162 hours) was critical for the educational and research process to be successful. These outcomes were also influenced by the activities of experienced teachers who value social justice. The course curriculum, including field activities for the cultural, artistic, and technological facilities of the cities (e.g., streets, community libraries, theaters, museums, cultural and community centers, murals, schools, and coworking spaces), contributed to the participants reflecting deeply on topics of social justice: empowerment, freedom, communities, equity, students' realities, oppression, and social responsibility.

At this juncture of the project, we aim to (1) create a web portal to make the content of this study accessible to teachers and other education professionals; and (2) distribute QR codes to educational spaces that direct learners to the curated resources. In this regard, we understand that critical pedagogical practices will lead to equitable spaces and create

opportunities to access culture, communication, and arts. In the face of socio-political scenarios of forgetfulness and inequality in the region where the research was conducted, redesigning our educational practices is critical. May more experiences occur and more stories be told to motivate educators in Brazil and around the world to fight for an education based on social justice and equity.

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Humanities Education in the U.S. Rural South: Design, Development, and Practice

Katherine Walters, Theodore J. Kopcha, & Christopher Lawton

Social Justice   Project-based Learning   Humanities   Design-based Implementation Research   Rural

Middle School   US South   Reflexivity

The purpose of this paper is to present the results of a humanities education project that took place in a middle school in the rural U.S. South. Through a partnership between a state university and local school system, K-12 teachers engaged in two years of professional development on the integration of humanities education into the regular curriculum through project-based learning (PBL). During this project, teachers were required to personally and professionally engage with racial tensions rooted in the history of the local community as they learned to implement their PBL activities. This context is central to the design and implementation of the project as presented in this paper. We detail three learning strategies that emerged and how these were taken up by teachers: the personalization of history, historical perspective taking, and modeling a critical position. We discuss the implications of these strategies for integrating PBL and humanities education in a way that attends to socio-cultural-historical contexts. Implications for the practice of learning design in similar contexts are also discussed.

Introduction

The racial and economic iniquities of the past continue to impact rural areas of the U.S. South. This is especially noticeable in K-12 education, where those inequities often manifest as lower performance on standardized tests and fewer graduates entering four-year colleges than the national average (Lavalley, 2018). The rhetoric around educational reform in rural areas, however, often focuses more on escaping poverty than addressing the longstanding roots of that poverty (Schafft, 2016). Whether intentional or otherwise, this focus affects students in profound ways. Some students develop disfavorable narratives about the place in which they live that, over time, lead them to leave rather than stay and improve the issues within the community (Schafft, 2016). Others remain in those areas after graduating high school,

often struggling to understand why they are viewed as having failed for staying in the place they call home (Jones, 2006; Schafft, 2016).

Humanities education is one way to introduce educational reform in rural and disadvantaged areas that can help address the longstanding roots of poverty. In this paper, the term *humanities education* represents educational reform efforts that go beyond a single class (e.g., language arts; history) or set of content-area standards. Such efforts emphasize human agency and creativity through stories of collective action (Anderson, 2002). This typically involves students engaging in sustained inquiry by taking differing perspectives around issues that are present in the community (Walker, 2009). It is a humanizing mode of thought that attempts to understand people as "free and responsible agents who bring about a world" (Anderson, 2002, p. 136). Such perspectives are rooted in the work of John Dewey (1916) and Paulo Freire (1970), who promoted the idea that schools should teach about democratic society and engage children in debate about fundamental notions such as equality and justice. Studies have shown that humanities-based approaches to K-12 education can help disadvantaged youth improve their performance on content-area standards while also understanding themselves through their relationship with the people in their community (e.g., Hadley, Burke, & Wright, 2019; San Pedro, 2016).

While humanities education has tremendous potential to improve education in rural areas, it is often overlooked as a viable option for reform. As noted by Schafft (2016), a more common view is that school improvement will result from generating competition between schools. Such neoliberal views often lead to reform policies that focus on mastering standards rather than better understanding oneself in relation with the development and growth of the community (Schafft, 2016). For example, recent national policy in the US suggests that improving achievement in STEM education will lead to economic prosperity (Honey, Pearson, & Schweingruber, 2014). While this policy is undoubtedly important, it largely focuses on improving subject-matter outcomes rather than the integration of place and community in K-12 education. As a result, current educational reform tends to overlook a critical opportunity to equip students with the skills needed to negotiate the challenges that rural communities face today (Schafft, 2016; Jones, 2006).

The purpose of this paper is to present the results of a humanities education project that took place in a middle school in the rural US South. Through a partnership between a state university and local school system, K-12 teachers engaged in two years of professional development on the integration of humanities education into the regular curriculum through project-based learning (PBL). That work required them to personally and professionally engage with the racial tensions rooted in the history of the local community as they learned to implement their PBL activities. At the end of the two years, we collected data from students and teachers to assess learning outcomes and inform the overall design of our approach to humanities education. The research questions guiding our study were:

- How did our approach support teachers in meeting state standards?
- What aspects of humanities education were taken up by the teachers?

Project Design: Project-Based Learning with a Humanities Focus

Teachers engaged in two years of professional development on project-based learning that was blended with a humanities focus. Project-based learning (PBL) is an instructional approach that supports student engagement in real-world, or "nontrivial," projects and problems (Blumenfeld et al., 1991). As shown in Table 1, students typically lead an investigation centered on a driving or challenging question, synthesizing their findings into a shareable artifact (Barron et al., 1998; Larmer, Ross, & Mergendoller, 2017). Student learning is situated in an authentic context, allowing for both discipline-focused exploration and interdisciplinary learning. Students produce an artifact that reflects their learning and application of skills, and that artifact is made public for others to view. Both teachers and students reflect on the process and their learning throughout the PBL activity.

Table 1

Intersections of PBL and Humanities Education

PBL Element*	Description*	Humanities Component
Challenging Problem or Question	An "open-ended, inspiring, and understandable" driving question frames the project.	Teachers identified questions around issues of poverty and segregation after viewing the NARA photographs (e.g., How do you and others impact your community? How do our past experiences impact our present? How are people affected by and from stereotyping?)
Sustained Inquiry	Student-generated questions are researched throughout the project by gathering / interpreting data, building evidence, and creating and evaluating solutions.	Focus on identifying and finding evidence of multiple perspectives, as well as engaging with and making sense of these perspectives. Through this process, students construct, and share, their own perspectives.
Authenticity	The project relates to "students' concerns, interests, or identities" and/or involves "real-world tasks, tools, and quality standards."	Student work was situated in the local historical context; NARA photos were used to explore social issues and take perspectives relevant to the current culture of their community.
Student voice and choice	Students have "significant responsibility" in the project, including making decisions about the questions, resources, tasks, and products used/ created.	Students chose what photographs to focus on, what product to create, and how to present their findings.
Public multi-modal products	Student work is available to people outside of their classroom. Students publicly explain their work, including their inquiry process and decision-making.	Student work was presented publicly in the schools (e.g., art hung in hallways) as well as a community event hosted at a local art/cultural center.
Reflection	Throughout the project, students and teachers reflect on what content was/is being learned as well as the inquiry process itself.	Reflection occurred largely through in-class class discussions.

*Note: Descriptions and direct quotes are taken from the Buck Institute for Education (2019) Project Design Rubric

The benefits of PBL are supported through research. Tamim and Grant (2013) and others (e.g., Hmelo-Silver, Duncan, & Chinn, 2007) have reported that students of teachers experienced in PBL improved in their motivation, engagement, learning, and acquisition of academic and non-academic skills. Although the exact nature of student work products is dependent on the content that is addressed, most PBL products are multimodal. In other words, student work includes more than one mode of communication, such as text, images, color, and use of space. Multimodality as a pedagogical approach centers students' meaning making practices by providing them opportunities to engage in both artifact creation and the assessment of multimodal resources (Kress, 2010). Students construct and interpret multimodal resources as a way of making sense of the world around them, as well as to engage in social critique (DeJaynes & Curmi-Hall, 2019).

While both PBL and humanities education have their own rich literature base, the intersection of these is less often articulated as a form of applied instructional design. As shown in Table 1, the humanities focus in this study came from the way that teachers created opportunities for students to take differing perspectives and explore issues that were present in the community. Those opportunities came largely from a series of photographs taken within the community in 1941 that are publicly available through the National Archives Records Administration (NARA) (see Figure 1).

Figure 1

Sampling of 1941 National Archives Records Administration (NARA, ca. 1922-1947) Photographs and Original Captions.

"These pictures were taken inside the newest and best dairy in [Town]. Unlike most, the buildings are wired for electricity -- a recent improvement, made possible by REA -- and a new compressor cooler has just been installed. Milking, however, is done by hand. The owner has two [African-American] hired hands to help with the job." (#521309)

"This one-room cabin is the home of an ex slave. Too old to work, she is taken care of by the descendants of the family to whom she belonged." (#521416)

"[City Name], Saturday Afternoon." (#521250)

"African American tenant house." (#521273)

Description of photographs in Figure 1. Top left: Inside a dairy, two African American men seated at stools milk cows. The men, and the cows, are facing away from the camera. The men are dressed in jean overalls, shirts rolled up to the elbows, and matching caps. Top right: An elderly African American women in a print dress sits in a single-room cabin. She faces to the left, off-camera. The room has several rocking chairs stored behind her, and a metal-frame bed is visible in the bottom right corner. Bottom left: Several people are visible on a sidewalk in front of a grocery store. Women in the photo are wearing dresses and heels and standing close to the store. Large awnings display signs. Legible signs state: "Tea 15¢", "Ham 30¢", "Potatoes 10¢". More signs are visible, but not legible. An older man and a youth lean against a garbage can in the forefront of the image, both facing towards the store. Bottom right: A small, single-room house with a porch is shown from the front. A chimney on the left side of the house is made of brick; the rest of the house is wood. There is a ladder on the roof. The house is run-down. On the porch sits an African American man with a guitar in black pants and a white shirt. Next to him is a toddler. He is facing up and to the right, where another man is sitting in a chair with a woman in a printed dress leaning against the doorway behind him.

Each teacher produced at least one project-based activity that integrated the photos to support student-driven inquiry that aligned with state standards, resulted in a multimodal product that reflected student learning, and encouraged students to take differing perspectives around the social issues that have been and, in many cases, continue to be present in their community. Our thinking was that the photos would offer students a rich, authentic context for PBL activities that provided a way for students to explore social issues and take perspectives that are relevant to the culture of the community (Danker, 2003; Ladson-Billings, 1995). Engaging with multiple perspectives helps students begin to see how the past connects to their experiences in the present, which helps cultivate a stronger connection to and understanding of their community (Lovorn, 2012; Smith & Sobel, 2014; Walker, 2009).

Methods

Context

This project took place in a rural community in the US South whose schools serve approximately 3,500 students (44% white, 41% black, and 11% Hispanic). Like many rural communities in the South, its history is one of racial inequality and those who have challenged it, spanning from the practice of slavery through Jim Crow and the Civil Rights movement. Although the overt racial and economic segregation of the past has faded with each successive generation, the structural remnants persist: approximately 30% of the community's under-18 population currently live at or below the federal poverty level.

In this context, there is an opportunity to explore and construct narratives that reflect the community as the vast majority of residents have experienced it. Residents over 60 have clear memories of racial oppression and the struggle for civil rights, and some can still trace their lineage back to family members who were at one point enslaved. These older generations have their own stories to tell of the hardships, victories, and changes that have transformed the place of their childhood into the one in which their grandchildren and great-grandchildren are now growing up.

This context, then, positions this study as one that explores how learning design might be taken up to address issues of social justice. The teachers in this study were not just learning to implement PBL in their classrooms. They were also challenged with integrating photos of the community's past into their teaching. Those photos offered a glimpse of the racial and economic inequality that existed in 1941; they were included as part of a series of reports on rural life funded by the Works Progress Administration. The report on the community that serves as the context for this study highlighted the way that racial segregation intersected with the community's shifting economic structures (see Wynne, 1943). For the research team, this context demanded sensitivity, both to the history behind the photos and the needs of the teachers who would introduce them to their students.

Participants

Six middle school teachers participated in this study. One identifies as a white male, four as white females, and one as a Black American female. Their number of years teaching spanned from 3 to 24, with a median of 11 years in the classroom. For all but one, this teaching experience has occurred entirely in their current county. Teachers in the study received a stipend for their participation in the professional development.

Teacher Professional Development

The two-year PD program focused on designing, developing, and implementing learning activities that met state standards and integrated the NARA photos and local community. The PD drew largely on the materials produced by the Buck Institute for Education (BIE) that supports project-based learning in K-12 settings (Larmer, Ross & Mergendoller, 2017). Specifically, teachers used the BIE lesson template tools to plan for the development and implementation of PBL. The template structured teacher lesson planning in a way that addressed the PBL elements noted in Table 1 (e.g., driving question; sustained inquiry; student choice and voice).

The PD entailed an annual day-long summer workshop, followed up by regular meetings and in-classroom support throughout the year. As shown in Table 2, Year 1 focused on developing and implementing a PBL activity, whereas Year 2 focused on improving the activities from Year 1 while also increasing the number of participating teachers and subject areas represented.

Table 2

Professional Development (PD) Activities and Focus by Project Year

PD Activity	Year 1	Year 2
Summer Workshop	• Explore NARA photos • Identify photos relevant to specific content areas • Develop PBL around photos • Create an implementation plan	• Recruit additional teachers • Vertical and horizontal alignment of themes across grades and subject areas • Peer feedback • Design a second PBL lesson or expand on initial lesson
Regular Meetings	• 2-3 meetings per year at grade level • Individualized planning and implementation support	• 2-3 meetings per year at grade level • Individualized planning and implementation support
In-Classroom Support	• Support during implementation • Provide description of overall project to students • Access to/creation of materials to support student inquiry	• Support during implementation • Pre-class discussions and post-class feedback • Connecting overall project goals and individual classroom goals/lessons • Access to/creation of materials

As shown in Table 3, the teachers' PBL activities took place across disciplines such as social studies, English Language Arts (ELA), mathematics, and science. Across those six teachers, nearly 100 students participated in a PBL activity. For the majority of those students, this was among their first PBL experiences that incorporated the community. In total, 36 student projects were included for analysis.

Table 3

Overview of PBL Activities Created by Middle School Teachers

Course	Lesson Title	Description	Gr.	Content Standards
Mathematics	Paint the Past	Students calculated surface area situated within past and current photographs of local historical sites.	6	Mathematics: Geometry
Current Events and Critical Thinking	[City Name]'s Past	Students analyzed photographs to develop historical perspectives. Choose between writing a story about a photograph or a presentation on the development of a technology in the photo.	6	Social Studies: Information Processing
Current Events and Critical Thinking	This is us: [County Name]	Students developed presentations where they wrote how each person in a photograph contributed to their community as a hero: a NARA photograph, a local hero, and a selfie.	6	ELA: Reading for Information
Life Science	Ecosystems and How they Work	Field work including local hike and soil sampling around human use of environment	7	Life Science
ELA	Historical Narratives	Exploration of bias and point-of-view through the creation of historical narratives	7	Social Studies: Literacy in History
Art	Community and Quilting	Students created quilt tiles to represent personal histories	8	Visual Art: Creating and Connecting

Research Design

The current study is part of a larger Design-Based Implementation Research (DBIR) project that sought to integrate humanities education into the K-12 curriculum. DBIR (Penuel, Fishman, Cheng & Sabelli, 2011) emphasizes an iterative process of developing, testing, improving, and retesting a research-driven educational intervention through deep collaboration with local contexts (see also Cobb et al., 2003). As noted by Penuel et al. (2011), DBIR emphasizes *co-design,* meaning researchers and local stakeholders (e.g., administrators, teachers, students) work collaboratively to shape and accomplish the driving goals of the project. Involving stakeholders (e.g., teachers, curricular coaches) in iterative co-design places a focus on sustaining change within the school system over time; it leads to the formation of research-based learning principles and practices that advance theory while having relevance in an applied context (Penuel et al., 2011).

DBIR is an umbrella method that allows for various approaches to data collection and analysis. With each iteration, the research team improves the intervention while focusing more deeply on the constructs and mechanisms that support learning. With that in mind, the current study builds on our prior research that describes our theoretical approach to humanities education (Lawton et al., 2020) and the impact of our approach on teachers and students (Walters et al., 2020). The goals for the current study were to establish the efficacy of our approach. We first wanted to understand the ways in which our approach to humanities education supported teachers in meeting state standards (RQ1). Second, we wanted to identify the elements that became most salient for the teachers (RQ2).

Data Collection and Analysis

Data were collected from both students and teachers with approval from our Institutional Review Board's (IRB) guidelines for confidentiality. Student data came from scoring their PBL projects completed at the end of each activity. As shown in Table 3, each of the six teachers met different standards, ranging from math to ELA and art. Thus, we developed and used different rubrics to analyze student work, one for each PBL activity. These were developed collaboratively with the teachers to ensure validity. For example, one teacher's PBL unit addressed the standards for calculating surface area in math. The corresponding rubric evaluated student calculations on a series of surface area questions that related to the NARA photographs, assigning a point for each correct calculation. Another addressed the social studies standards associated with literacy in history. The corresponding rubric included criteria such as Narrative Voice, Use of Historical Evidence and Historical Orientation (ARCH, 2013), scored on a 3-point scale that ranged from Demonstrated Proficiency (3) to Approaching Proficiency (2) and finally Not Proficient (1).

Teacher data came from two semi-structured focus group interviews conducted via videoconference at the conclusion of the two-year professional development effort. We chose videoconferencing because face-to-face interviews were not possible due to COVID-19 restrictions. Interview questions explored the teacher's experiences with the project and PD, such as what the teachers learned and the perceived benefits for students.

Each interview was transcribed and analyzed for thematic patterns around the research questions. Analysis consisted of consensus building as detailed by Braun & Clarke (2006). Each researcher first conducted an independent reading, coding sections of the transcript with shorthand descriptors for underlying ideas, assumptions, and concepts (e.g., critical thinking, teacher challenge, community connection). The team then met to discuss those descriptors, grouping them under larger thematic headings. These themes were then reviewed as each member revisited the transcripts to mark sections using the larger theme headings. They met one more time to establish a consensus about the final themes and examples of each theme.

Positionality Statement

Positionality refers to an understanding of one's identity and the way this identity impacts ways of knowing. This concept is critical in research where the researcher is as much a part of the data collection and analysis as the methods and tools (Bourke, 2014). Our positionality statement acknowledges that we are white scholars who live in communities that are different from that of our participants. We have not personally experienced the types of racial oppression many of our participants have. Being aware of this, we intentionally adopted a reflexive design and research practice entailed ongoing reflection about our perspectives in relation to that of the research participants and their impact on the research study. This became particularly important when navigating the tensions that arose around long-standing racial and economic injustices in the community, as well as when determining how to support both teachers and students in exploring those tensions. This reflexivity also supported our DBIR approach in that it positioned the teachers as co-designers; we created regular opportunities for the teachers to give input that helped shape the direction and focus of the project as it evolved. Thus, our work centered and valued the different ways of knowing and knowledge each partner brought. Our goal was to continuously develop our understanding of the design through our interactions with each other, the teachers, and the students.

Findings

Research Question 1: How did our approach support teachers in meeting state standards?

One immediate goal for our project was to make sure that our approach supported teachers in meeting the state standards. As shown in Table 4, the mean scores on student work ranged from 75.00 to 97.50 (out of 100), suggesting that the standards were met or exceeded. Data from teacher interviews revealed that the teachers felt their students were engaged in the PBL activities and met the intended standards. One teacher stated that her students who "do not normally" speak up in class were excited to discuss the photographs. The teacher described how students recognized locations in the photos (e.g., "I know that place!" or "I've been there!") and felt that this familiarity supported the students' engagement with the activities. Another teacher stated the approach to humanities education supported the way she likes to teach, using primary historical sources in an ELA course. This interdisciplinary work supported students meeting Literacy in History writing standards.

Table 4

Student Artifact Scores (out of 100) by PBL Activity

Course	Lesson Title	Gr.	Content Standards	Rubric Items	N	M	SD
Mathematics	Paint the Past	6	Mathematics: Geometry	Represent 3-D Figure; Calculate Surface Area; Apply Calculations	6	95.00	5.48
Current Events and Critical Thinking	Eatonton's Past	6	Social Studies: Information Processing	Organization; Elaboration; Historical Orientation; Writing Conventions	10	97.50	12.08
Current Events and Critical Thinking	This is us: Putnam	6	ELA: Reading for Information	Use of textual evidence; integration of multimodal information	13	75.96	21.02
Life Science[a]	Ecosystems and How they Work	7	Life Science	N/A	N/A	N/A	N/A
ELA	Historical Narratives	7	Social Studies: Literacy in History	Narrative writing organization, voice, ideas, and conventions; Use of historical evidence; Understanding of historical orientation	7	88.89	4.81
Art[a]	Community and Quilting	8	Visual Art: Creating and Connecting	N/A	N/A	N/A	N/A

[a]Data were not available in these classes due to constraints associated with COVID-19

Research Question 2: What aspects of humanities education were taken up by the teachers?

Three themes emerged from the focus group interviews related to the way teachers and students took up aspects of humanities education: the personalization of history, historical perspective taking, and modeling a critical position. The personalization of history refers to the way that students recognized their own experiences as meaningful and part of something larger than themselves (e.g., the events of the past). Four of the teachers discussed how students struggled initially with seeing their personal, day-to-day experiences as meaningful. The art teacher stated students had to "give themselves permission to use their experiences . . . for their artwork." Other teachers described similar experiences, explaining how eventually "it clicked" as their students created artwork, narratives, multimodal presentations, and other artifacts around their personal experiences.

A key aspect of this "clicking" was the act of connecting the students' experiences with the broader community. In the *This is Us* activity, students identified specific details of their own lives (e.g., what they do for fun; what they like about where they live) before imagining what the lives of past youth in their community may have looked like. They then created multiple artifacts linking selected NARA photographs, YouTube music videos, present-day images, and

locations in the community. Through this creative process, the students began thinking about themselves as if they were living in the past. This helped them create contrast between how things *used to be* in the community as compared to how they *currently are.*

The comparison between past and present reflects the way that historical perspective taking took place in this study. Historical perspective taking is a process of "explor[ing] and reconstruct[ing] the internal states of a person of the past" (Nilsen, 2016, p. 375). As Nilsen and others (Endacott, 2014; Rüsen, 2005) have noted, historical perspective taking focuses on the stories of individual people and their experiences rather than overarching and impersonal historical narratives. In this study, all the teachers described how they created opportunities for historical perspective taking. Five described how they helped students understand how specific experiences of people from the past related to larger historical themes in the present. As one explained, "Like the civil rights movement . . . it really comes down to those little moments, that one day at the lunch counter . . . it's the small moments that make our lives." Another described how she helped students focus on how their day-to-day lives were similar to the lives of the people in the photographs. Her students' projects contained writing that explored how moments of celebration and joy are a natural part of life, both in the past and in the present.

Another way that teachers connected the past with the present was to engage students in constructing historical fiction. In the *Historical Narratives* activity, students created characters that were similar to themselves—the same age and living in the same place—but also not like them in the issues they faced, such as segregation. The students achieved this by blending their personal experiences with the issues of the past. The teacher explained, "This helped students construct believable characters by connecting to their characters' emotions and desires in unfair circumstances" -- emotions such as confusion, distress, and anger over "racial discrimination and the desire to fight for their interracial friendships." This suggests how historical perspective-taking allowed students to understand a national historical event, segregation, through the everyday experiences and emotions of someone their own age, in their own town.

The final theme that emerged centered around the critical position two of the teachers modeled for their students. A critical position refers to the way that teachers drew upon student assumptions, mindsets, and experiences to support difficult conversations about race, economics, and change in the classroom (Freire, 1970; Jones, 2006; Ladson-Billings, 1995). In one 6th grade classroom, students saw black and white photos and assumed, because they were of the past, that they depicted slavery. The teacher described how this assumption reflected the students' understanding of their community, based largely on the dominant narrative of the past that focused on racial inequality and oppression. Her response was a critical one, pushing back on the dominant narrative in an attempt to construct a new, more positive one. Specifically, she used activities such as "finding themselves in the pictures," and identifying examples where "kids [were] just kids," in order to make connections between the past and the present. She also emphasized an image depicting a black landowner, suggesting that not all of the dominant narrative was accurate. This eventually helped the students learn that the context of the photos was not slavery but actually the experiences, positive and negative, of both black and white sharecroppers.

Discussion

In this paper, we applied a humanities focus to the core elements of PBL. This is not necessarily a new idea; Youth Participatory Action Research (YPAR) similarly blends PBL elements (e.g., sustained inquiry, student voice and choice, multimodal products) with a focus on perspective taking within a local context (Burke et al., 2018). What is unique to this paper, however, is the way PBL and humanities education were implemented in a community in which long standing issues of racial and economic inequality persist today. The inclusion of the NARA photographs challenged both the teachers and us, the designers, to find ways to drive and sustain inquiry while allowing students to have their own voice and choice, take multiple perspectives on sensitive issues of the past, and make connections with the community in the present.

The results of our study suggest that our approach was successful in several ways. To begin, the humanities-focused PBL activities developed in this project met the immediate goal of achieving state content standards. Project mean scores consistently fell between "Approaching Proficiency" and "Demonstrated Proficiency," which suggests that the teachers were able to successfully integrate their PBL activities into the classrooms. This outcome is worthy of note. Teachers often avoid PBL activities out of concern that they require too much time to meet the required standards (Tamim & Grant, 2013). This study adds to a growing body of literature that suggests the opposite—that teachers can engage students in PBL while mastering content-specific standards (e.g., Blumenfeld et al., 2000; Boardman et al., 2021; Condliffe, 2017; Krajcik, McNeil & Reiser, 2008).

At the same time, our results suggest that our approach to humanities-focused PBL was not merely a content-delivery system. The teachers' PBL activities created opportunities for going beyond the standards through three distinct learning strategies: the personalization of history, historical perspective taking, and modeling a critical position. These strategies provide insight into the ways that the teachers in this study balanced the elements of PBL with the goal of implementing humanities education. With regard to the personalization of history, some teachers had students draw connections between the activities portrayed in the photos and their personal and/or family's past. Others built a personal connection by engaging students in exploring how the photos related to regional and national events in history (e.g., sharecropping; changes in economic structures). Regardless of the approach used, the importance of creating personal connections with history was evident. It created an opportunity for our teachers to move beyond the analytic aspects of historical thinking towards the formation of one's own identity that can occur when making personal connections with curricular materials (Barton & Levstik, 2004). Without a personal connection to the events of the past, many students fail to see their identities represented in the history classroom -- particularly those marginalized by gender, race, and/or economics (Barton & Levstik, 2004; Collins, 1991).

The focus on making a personal connection with history lent itself to driving and supporting students' sustained inquiry which, in this study, took the form of historical perspective taking. The photographs showed places familiar to the students, but from a time when different rules and norms regulated political, economic, and social life. Multiple teachers noted how this familiarity helped the students gain perspective about the events and people depicted in photographs. By taking on the perspectives of individuals from the photographs, students began to see themselves as if they were the people in the photos—people who took action and contributed to the creation of the present-day community. It made the emotions and relationships portrayed in the images more relatable for the students, which then became an entry point into more complex conversations about the racial and economic challenges that the community has faced over time. The ability to relate to and empathize with the people of the past is a goal of humanities education (Anderson, 2002; Walker, 2009), further suggesting that our goal for humanities education was realized in some way.

Personalizing history also supported opportunities for some teachers to engage in taking a critical position, exploring how the past coincided with or contradicted the students' experiences in the present. Several teachers noted that they intentionally shared stories that pushed against the dominant narrative. For example, one emphasized the uniqueness of a 1940s African-American landowner in order to challenge the students' overall assumption that all non-white residents were enslaved or poor. In this way, the teacher took a critical position that challenged the single dominant narrative of the community. Insight into the way that the teachers engaged in taking a critical position is important. Previous studies suggest direct engagement with critical issues and exposure to a diversity of perspectives can support students in developing critical positions (Barton & McCully, 2012; Parkhouse, 2018). However, this remains a complex and difficult task for teachers requiring a deep understanding of both social justice issues and their students' histories, cultures, and previous knowledge (Ladson-Billings, 1995; Parkhouse, 2018; Cummings, 2019). Finding ways to include rather than avoid conversations around sensitive issues such as racial and economic inequality can improve education for students whose lives are directly impacted by those issues (Cummings, 2019; Ladson-Billings, 1995).

Implications

One implication from our study is that it is important when engaging in humanities education to begin with activities that support learners in making personal connections with the people and events of the past. This practice, which emerged as part of the teachers' implementation, offers insight into the design of humanities-focused PBL in

disadvantaged areas such as the one in this study. Asking students to imagine life in the past, through the events and people depicted in the photographs, sustained inquiry that created a space for students to talk and think about themselves. In turn, it supported teachers in modeling ways of challenging common and often disfavorable narratives about the community. In this way, the teachers in this study were able to realize the vision for humanities education as a form of educational reform. They were able to focus less on the deficits of their community and help students empathize with others and empower themselves by understanding how their lives in the present relate to the past (Levstik & Barton, 2011; Wineburg, 2001).

The current study also carries implications for the practice of instructional design. As designers engaging in a project that intersected with social justice issues, we recognized that we needed an approach that was sensitive to the power differentials that were likely to emerge throughout our work. We ultimately took a reflexive stance, which was essential in supporting our teachers as co-designers as part of our DBIR effort. It acknowledged the fact that our teachers came to us with their own ways of knowing, based on their own experiences in the community. Our own experience in this regard is consistent with other DBIR scholars who have emphasized the importance of a mutual, trusting relationship with participants in any educational design effort (Gutiérrez & Jurow, 2016; Penuel et al., 2011)

Conclusion

The purpose of this paper was to share our experience with incorporating humanities education into the K12 curriculum. While the data supports the efficacy of our approach, our work offers insight into the intersection of learning design and contexts in which racial and economic inequities persist. In many ways, our reflexive process helped model the humanities approach we hoped to achieve; it centered on our relationship with our participants and the community, and how that relationship developed and grew over time. It is our hope that this paper serves as an example for others as they negotiate the complexities inherent in this type of work.

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STEM Teachers' Designs for Learning: Addressing the Social and Political Climate During COVID-19

Tiffany A. Roman, Belinda P. Edwards, Michael Dias, & Laurie Brantley-Dias

This study examined how seven math and science secondary teachers addressed social justice teaching during the COVID-19 pandemic and how their instructional practices mapped onto their pedagogical intentions. Guided by trauma-informed teaching practices and learner engagement conceptual frameworks, the authors argue STEM induction teachers need greater support to design instruction that enables students to apply knowledge to social justice issues. Participants' understanding and enactment of social justice pedagogy varied, leading the authors to provide continued support to the cohort of teachers for their students to feel empowered to address, discuss, and apply the discipline knowledge in STEM to social justice issues.

Introduction

Although the social and political climate of the United States and the COVID-19 pandemic present challenges for all, an opportunity exists for teacher educators to work collaboratively with educational agencies, schools, and teachers to provide "expertise, research, and a commitment to centering social justice and equity" to support teachers and students during and beyond the pandemic (Campbell et al., 2021, p. 5). One means of addressing social justice and equity issues for those with instructional design expertise is to support educators on the design and development of social justice teaching personalized to their classroom contexts; however, the ways in which teachers designed lessons and facilitate social justice teaching during the COVID-19 pandemic is not well established. Therefore, this study examines how a cohort of science, technology, engineering, and mathematics (STEM) teachers, who were supported in creating online and blended lessons attending to the socio-emotional and engagement needs of students, expanded their instruction to include social justice issues of interest.

This article argues teachers, especially those in the induction years, need greater support to design instruction enabling students to apply knowledge to social justice issues. To this end, the researchers designed and delivered a free five-week online summer professional development (PD) opportunity for 11 teacher participants that supported personalized learning goals for online and blended teaching. The PD was guided by trauma-informed teaching practices (Carello, 2018) and learner engagement conceptual frameworks (Bond & Bedenlier, 2019; Bond et al., 2020; Fredricks et al., 2004) as part of a larger case study examining how a cohort of secondary STEM teachers designed online instruction to support student engagement (see Roman et al., 2021). When viewed through the lens of trauma-informed teaching, teaching and learning is student-centered with an emphasis on both cognitive and affective student engagement. In this study, participants were asked to create engaging, trauma-informed remote learning experiences for their students. Participants were also encouraged, but not required, to address the social and political climate within the project they designed.

Literature Review

In the following section, a definition of social justice in education is provided and the approach to social justice pedagogical practices is explained. Then, the article delves into social justice teaching practices in STEM education, and details specific *approaches* within mathematics and science education.

Social Justice in Education

A challenge in addressing social justice in education is that the construct itself is broad, resulting in various interpretations and definitions. Social justice in education has been defined as "a set of attitudes, beliefs, and behaviors in relation to teaching, learning, and students that form the foundation of one's pedagogy" (Nieto, 2013, p. 21). Thus, one's attitudes, beliefs, and behaviors are foundational to one's perspective on social justice. For purposes of this paper, the study uses Nieto's (2013) assertion that social justice pedagogy (a) confronts biases that amplify inequality; (b) builds upon the assets of all learners; (c) provides all learners the material and emotional resources needed to succeed; and (d) supports all learners in developing agency to participate in democracy (p. 21). Additionally, the researchers view culturally-responsive pedagogy as complementary to social justice pedagogy, particularly for those designing instruction. Young and Asino (2020) have long advocated for more "cultural considerations of how the design of curriculums, experiences, and technologies for education influence and affect learning" (p. 278).

Teaching for social justice is much more than method. The researchers frame teaching for social justice as an approach driven by the conviction that: (a) people, not disciplinary subjects, are the focus of the work and (b) subject matter is a context for learning mastery of oneself for making a positive difference in one's realm of influence (Berry et al., 2020; Rubel, 2017). In other words, to teach for social justice requires a human-centered approach in which students seek to create positive change in their local or broader community. Typically, teaching opportunities promoting social justice tend to be curricular and extracurricular discussions sparked by controversial issues and problems bearing on educators' and students' sense of equality and equity. As faculty who support in-service STEM educators in Georgia, the researchers work to support secondary STEM teachers in their efforts to support students' growth in becoming citizens who apply STEM knowledge to the critical thinking and reasoned discourse characterizing participation in a democracy. This requires teachers to anticipate, plan, and enact instruction responsive to social issues of injustice which are in turn relevant to the STEM curriculum.

Social Justice Teaching Practices in STEM Education

STEM social justice teaching is defined as connecting the curriculum to issues students know and care about, and consequently, want to change. Teaching STEM for social justice involves helping youth identify inequities within their communities and determining how disciplinary knowledge can be used to understand and respond to local (often societal) issues (Barton, 2003; Esposito & Swain, 2009). When related to mathematics and science teaching practices, approaches are similar, but there are subject-specific differences. In the area of mathematics, Gutstein (2006) posited students can deepen their understanding of math by studying and using mathematics in the context of their lived

experiences which strengthens both their conceptual and procedural understanding and proficiencies. A challenge, however, is math teachers often feel state curriculum standards and standardized testing forces them to teach mathematics with a focus on formulas and procedures students can memorize and easily recall during testing (National Council of Teachers of Mathematics, 2014).

Like mathematics, in secondary science, externally imposed assessments of student learning influence how instruction is approached. Often, "covering content" may take precedence over building understanding via scientific investigations. When students' STEM education consists of test preparation via drill and practice or information transmission, they miss opportunities to think critically and to explore how STEM knowledge can be used to make sense of the world (Erduran et al., 2020). Because students are often exposed to social issues such as poverty, racial discrimination, food insecurity, wage gap, and more recently, the COVID-19 virus and its impact on their communities, they are filled with curiosity and questions that can be investigated and explored using STEM (Finkel, 2018).

Theoretical Framework

The theoretical framework guiding the social justice focus of this study included trauma-informed teaching practices (Carello, 2018). Trauma informed teaching practices are relevant as teachers and students are currently operating within the context of COVID-19, which Horesh and Brown (2020) argued should be viewed from a perspective of trauma. Trauma-informed teaching includes being aware and responsive to forms of privilege and oppression, as well as attending to issues of social justice (Carello, 2018). Trauma-informed teaching and learning principles include: (a) physical, emotional, social, and academic safety; (b) trustworthiness and transparency; (c) support and connection; (d) collaboration and mutuality; (e) empowerment, voice, and choice; (f) social justice; and (g) resilience, growth, and change (Carello, 2018; Fallot & Harris, 2009; Substance Abuse and Mental Health Services Administration, 2014). These principles were discussed with teacher participants to assist them in creating and facilitating instruction prioritizing students' emotional safety while minimizing any additional trauma (Carello & Butler, 2015) resulting from the social, political, and pandemic contexts potentially impacting their students' learning.

Taking a trauma-informed approach to teaching provides a framework for STEM teachers to create lessons that provide students with access to mathematics and science, support their understanding of the world, and help students to develop empowerment and agency in responding to social injustice (Berry et al., 2020; Gutstein, 2006; Ladson-Billings & Tate, 1995). Teaching STEM for social justice is critical to connecting STEM to students' lived experiences (Berry et al., 2020). Reasons for teaching social justice include (a) helping students learn to use disciplinary knowledge as a tool for social change; (b) empowering students to confront and solve real-world challenges; (c) connecting STEM subject matter with students' cultural and community histories; and (d) building an informed society (Berry et al., 2020). The reasons for teaching social justice presented by Berry et al. (2020) can be applied to teachers across all dimensions of STEM in secondary schools.

Research Questions

The researchers examined the following research questions related to teaching in trauma-informed online/blended learning environments during the COVID-19 pandemic:

1. How do secondary STEM teachers intend to address social justice teaching in their curriculum designs?
2. How did secondary STEM teachers' attempt to enact their curriculum designs for social justice teaching?

Methods

The researchers employed a single case study design (Yin, 2018) to examine how STEM teachers designed remote learning with intent to engage their students in mathematics and science instruction using trauma-informed pedagogical approaches while addressing the current social and political climate. A sub-group (seven out of 11) of early career STEM teachers who experienced a PD workshop comprised the case. In accordance with Institutional Review

Board approval, each participant provided consent prior to data collection. To ensure anonymity, participants were assigned pseudonyms.

Participants and Professional Development Context

Eleven STEM Teaching Fellows of the Institute of Citizens and Scholars (ICS), formerly Woodrow Wilson National Fellowship Foundation, received an online five-week summer PD opportunity during the summer of 2020. ICS enables individuals with STEM backgrounds to receive a graduate degree in STEM education, classroom experiences, and ongoing mentoring. As part of the program, the Fellows made a three-year commitment to teach in high-need secondary schools in STEM subjects. All participants had a Masters of Arts in teaching in their content area and one to three years of teaching experience (see Table 1). Of the 11 participants, a purposeful sample of seven expressed desire to increase social justice-oriented teaching practices and served as the case for this study.

Table 1

Participant Information

Participant Pseudonym and Years of Teaching Experience	Gender & Race	Subject Areas Taught in 2020-2021
KC 2 years	Female White	10th grade Biology, 9th grade Computer Science, 11th grade Genetics, 10-12th grades Biotechnology
LU 1 year	Female White	9th grade Biology
NX 3 years	Female Black	7th grade Life Science
NT 3 years	Male White	10th grade Biology
BC 3 years	Female White	10th grade Honors Chemistry, 11th-12th grade Biology, 9-12 CTAE Essentials of Biotechnology, 9-12 CTAE Applications of Biotechnology
EP 2 years	Female White	7th grade Mathematics
NC 2 years	Male White	9th-12th grade Engineering (four course levels)

The intent of the PD was to support the participants' cognitive, affective, and social needs (see Trust et al., 2020) and to provide training and support to help meet their professional goals for online and blended teaching (Trust & Horrocks, 2017). Structured as a Stage 1 pilot (Borko, 2004; Hill et al., 2013), implementation of the PD occurred online due to the COVID-19 pandemic. Three faculty members from instructional technology, mathematics education, and science education directed the PD in this study. The fourth faculty member on the project, with expertise in instructional design and teacher reflection, served as a research collaborator. These faculty wanted to use their leadership capabilities to provide high-quality PD (see Borko, 2004) by: (a) bringing together a cohort of educators with shared interests across different schools; (b) facilitating high-quality synchronous sessions/asynchronous learning opportunities; (c) addressing teachers' immediate needs; and (d) providing teachers with desired content expertise not readily available within their school or district (Bates et al., 2016). Participants attended five weekly synchronous sessions led by faculty facilitators and worked asynchronously on their projects throughout the duration of the PD. To support the teachers in the creation of their projects, each participant met one-on-one with the instructional technology faculty member for one-hour co-planning sessions in the second week of the PD. The faculty member introduced specific content-based instructional tools and strategies to support the participant in meeting identified goals grounded in trauma-informed, engaging, and remote learning experiences.

Data Collection and Analysis

The researchers collected participants' data from the summer 2020 PD workshop, as well as interview data obtained during winter of the 2020-2021 school year. Since teachers needed time to apply what they learned from PD in practice, data collected over time (e.g., months later) is recommended to better understand how teachers make sense of the knowledge and skills acquired during the PD and how changes, if any, are applied to their instruction (Dede et al., 2009). Table 2 identifies the data and data collection timeline that provided insights into the participants' design plans, decisions, and lesson implementation. Additional data were collected as part of a larger study on student engagement in online and hybrid learning environments (see Roman et al., 2021). Each participant was interviewed twice (see appendices A and B). The mathematics faculty educator conducted interviews with the mathematics and engineering teachers, while the science faculty educator interviewed the science teachers. Interviews were recorded using Zoom and audio files were transcribed using Otter.ai. Only interview data pertaining to STEM social justice teaching were included in this study. The research team developed theoretical and data-driven codes (Boyatzis, 1998) and used Atlas.ti Cloud to facilitate their collaborative thematic data analysis (Cornish et al., 2014). Codes derived from the principles of trauma-informed teaching (Carello, 2020) were used to identify data patterns related to social justice (see Roman et al., 2021). Open-coding was used to explore STEM social justice topics, teaching approaches, degree of implementation and barriers to implementation.

Table 2

Data Collection

Data Source	
Final Project Presentation Files	July, 2020
Final Synchronous Session Transcript	July, 2020
PD Exit Interview	July–August, 2020
Follow-Up Interview	January, 2021

Findings

Q1: How do secondary STEM teachers intend to address social justice teaching in their curriculum designs?

Table 3 provides a summary of planned and implemented social justice STEM lessons from each participant. Through the analysis of teacher artifacts and individual interviews, participants indicated they were devising ways to incorporate activities related to social issues including Black Lives Matter and COVID-19. For example, NX commented, "in light of everything that happened [in 2020], I think kids need to feel heard in the classroom, especially our black and brown kids." For her 7th grade life science students, NX developed a lesson facilitating student analysis and discussion of two medical research injustices: (1) the Tuskegee Study of Untreated Syphilis and (2) the taking and distribution of cervical cancer cells from Henrietta Lacks. These efforts stand in contrast to four participants who were not ready or interested in developing social justice-oriented STEM lessons. Of the seven participants who were interested in expanding their emphasis on social justice, one participant did not generate a specific curriculum connection for planning instruction relating to social justice. Nevertheless, she later reported guiding student discussions of social justice issues as an extracurricular component of her care for students.

Table 3

Participants' Social Justice Topics for Intended and Implemented Instruction

Participant ID	Social Justice Topics for Intended Instruction (summer 2020)	Social Justice Topics of Implemented Instruction (fall 2020)
KC	Environmental Science Topics: Food insecurity; energy and transportation Life Science Topics: COVID-19 epidemiology and racial disparities	Computer Science Topic: Digital divide and access to learning during COVID-19
LU	Biology Topics: Disproportionate impacts of COVID-19 on black and LatinX communities.	Biology Topics: Take/not take COVID Vaccine; GMOs; Designer Babies; Capitol Riots
NX	The workshop prompted her to develop a life science lesson guiding her 7th graders to analyze medical ethics.	Life Science Topic: Henrietta Lacks (planned for spring 2021); "climate refugees" from Isle de Jean Charles
NT	Biology Topics: Disproportionate impact of COVID-19 on people of color and lower-economic communities	Biology Topics: Flint River Crisis; Climate change's disproportionate effects on low-income communities
BC	Biology Topic: Race as a social, not biological, construct Chemistry and Biology Topic: Minority scientists.	All Science Courses: Discussions on current events that relate to social justice
EP	General Instructional Plans: Implement social justice strategies with students in classroom (e.g., creating community of support, connection and collaboration) but specific content-connections were not articulated.	Homeroom: Discussions on current events that relate to social justice
NC	Engineering Topic: Examining discrimination in STEM career and STEM education	After School Club: Changed the Robotics Club designation to LGBTQ

Note: The social justice topics listed were *intended* for instruction and communicated by participants during the final synchronous session of the PD, as part of a larger culminating presentation about instructional planning for COVID-19 online- or blended-learning with socio-emotional-affective supports. Thus, we were not surprised to find that the social justice topics *implemented* in fall 2020 were different and often more extensive than what was initially envisioned by participates during the summer PD.

Several science teachers, such as participant LU, planned to connect COVID-19 to their science content and the "disproportionate impacts of COVID in the black community and the LatinX community." Participant AB intended to engage students in conversations about "minority science inventors and contributors that get left out of the textbooks" and mentioned the intention to teach that race is not a biological construct. Similarly, NC, an engineering teacher, planned to teach a unit on STEM careers, guiding students to examine the injustices existing in STEM fields and education, including at their own school (see Figure 1 for NC's unit overview).

Figure 1

STEM Careers Unit Overview created by Participant NC

Picture of a PowerPoint slide describing the overview of a STEM careers unit

Two participants (NT and KC) planned to introduce projects based on environmental science and social justice. For example, KC aspired to increase the sense of belonging in science felt by her ninth-grade on-level environmental science students. Citizen science was her approach to " . . . help kids be like a citizen of the world, not just a high school science student." Her plans included providing students a choice of projects among several she identified as feasible in a blended or online environment. Her hopes for success were high, as she envisioned " . . . ongoing citizen science projects that every single student can participate in because they are things that either require an app on their phone, or there's a lot where they're doing data analysis by looking at pictures" (see Figure 2 for a list of KC's class project requirements). NT designed a unit on Human Impact on the Environment in OneNote for his students. He wanted to maximize problem-based learning using case-studies related to social and environmental justice. NT also made plans to increase student engagement via opportunities for student collaboration in Microsoft Teams (see Figure 3).

Figure 2

KC Citizen Science Project Requirements

	Due Date	Requirements
Part A	09/08/2020	Submit a proposal with the following information: (Use the template on the blog) • Summary of the research project • Explain how this research relates to Environmental Science • Explain why you chose this project • Describe what your contribution to the research will be • Whether you will be working with other students
Part B	09/14- 10/23	For four of the five weeks your weekly summary should include: • Summarize what you accomplished during the week • State which day(s) you completed the work • State the total time you spent for the week (20mins minimum) • Submit a screenshot/some kind of evidence of your progress One week of your choosing: • Teach someone in your house/life about your research project • Explain what you taught to this person and how it went • Reflect on what you learned from this experience and whether you enjoyed it
Part C	12/04/2020	This will be the final presentation for your project and it will include the following: • Overall summary of the research project, it's importance and how you contributed to the project • Connect your project to at least 2 units in a *meaningful* way • Explain how you went beyond the research and what you have created for that

Picture of project requirements with deadlines

Figure 3
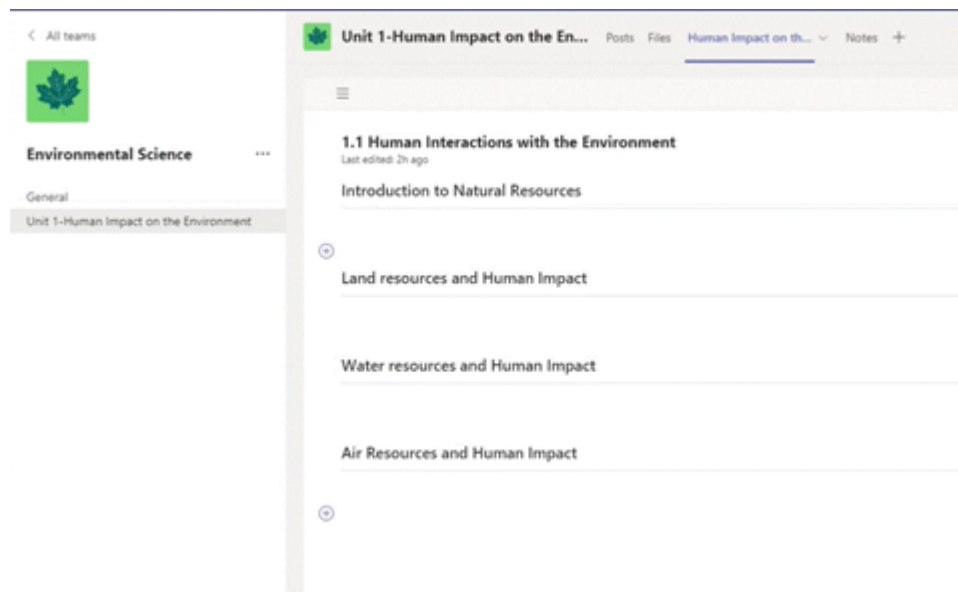
Screenshot of a unit and subtopics.

Q2: How did secondary STEM teachers attempt to enact their curriculum designs for social justice teaching?

In their final presentations, mathematics teacher participants articulated plans to facilitate lessons to address social injustices within the community; however, one of the two study participants cited several reasons why they were unable to implement their social justice related plans. The reasons ranged from not having enough time to adapt or create new lessons to a lack of resources or existing lesson exemplars. Participant EP stated, "I haven't had the capacity in my own life to really sit down and come up with some great mathematical way of looking at social justice issues." This comment was based on the challenges associated with time constraints involved in adapting current lessons to meet the needs of students learning in both virtual and face-to-face contexts because of COVID-19. It is not unusual for teachers to experience a lack of time to design, locate, or implement social justice mathematics lessons (Bartell, 2013). While teachers might be aware of social justice issues occurring in society, connecting those issues with mathematics can be difficult. EP explained "I have always found that in a math class it can be very difficult to find a way to address those [social justice issues]." Gregson (2013) and Gutstein (2012) reported engaging in discussions with students about community issues assists teachers to develop curriculum and activities enabling the construction of mathematics knowledge.

While some participants were challenged to facilitate planned social justice lessons in their specific mathematics classrooms during fall 2020, several were able to engage students in discussions around social justice issues (see Table 3). In some cases, these discussions led to actions. An engineering teacher participant, NC, encouraged and supported his Robotics club students who decided to use their voice at a school board meeting to advocate for changing the name of their local high school, named for a Confederate general. He also facilitated discussions with Robotics club members about becoming nationally recognized as a LGBTQ+ friendly school site. For another math teacher participant, EP, discussions with students during homeroom provided an opportunity to build relationships with students through listening and using what she knows about her students as a starting point for building connections to mathematics. Research suggests this is a first step to beginning the practice of culturally responsive or social justice teaching (Gay, 2002; Gutstein, 2012).

All five science teachers who had expressed interest in addressing social justice issues in their teaching at the beginning of the semester expressed continued desire to do so when reflecting on fall 2020 teaching at semester's end. Environmental pollution (e.g., Flint, Michigan water crisis) and disease transmission (e.g., COVID-19) are relevant topics

for chemistry, environmental, or life science courses. That three of these science teacher participants taught these issues with reference to disproportionate impacts on people of color and lower socioeconomic standing is early evidence of social justice teaching. Participant KC indicated two other social justice-oriented lessons from her computer science classes. One lesson was an ethical issue about crash-response algorithms in self-driving cars and the other lesson was a discussion about the digital divide. In the context of virtual schooling during COVID-19, the issue of " . . . who's allowed to learn now and who is not allowed to learn because of their access to internet or technology" was particularly salient.

In this first stage of collaboration with STEM teachers on social justice-oriented teaching, informal discourse is the first step these teachers seem to be taking together. That is, participants provided examples of either curricular or extracurricular conversations about social justice issues that emerged often from caring interactions with students. This is congruent with a shared social constructivist epistemology within the group of teacher participants and project leaders. It also seems to be a logical outgrowth of the summer 2020 professional learning community collaboration, through which application of trauma-informed instructional design principles and student engagement indicators led the group to a deepened appreciation for how social and affective engagement supports learning. Participant LU represents the experience of four of the participants, regarding school during the first week of January 2020 stating "We literally had a spur of the moment conversation last Friday, about everything that transpired last week [January 6 Capitol riots], and we were encouraged to do that by the district." It was also LU who stated the widest variety of references to social justice issues in her fall 2020 teaching. These included discussions of genetically modified organisms, "designer" babies, and reasoning behind peoples' choice to receive or avoid vaccination. NX related two historical injustices from medical research suffered by Black Americans as an upcoming opportunity for social justice instruction in life science:

> *I've always wanted to hit the Henrietta Lacks issue in genetics and every year I say I'm going to do it and I never get it but I'm definitely going to do it this year. So that's not a present issue but I can tie it to the mistreatment (of) . . . the Tuskegee (syphilis) study, and why right now there are a lot of people of color who are distrusting of the [COVID-19] vaccine.*

Although outside the immediate scope of this study, four out of eleven participants from the larger engagement research project (Roman et al., 2021) stated they did not intend to implement instruction related to social justice. Reasons cited included difficultly "fit[ting] it into their curriculum" due to online learning amid COVID-19, as well as concerns about emotional fatigue. These perspectives highlight important work remaining in supporting *all* teachers to use STEM as a tool to address issues of social injustice (Berry et al., 2020). There is a need to co-construct with these teachers, to create a working definition of social justice-oriented teaching, and to engage in culturally responsive and culturally sustaining pedagogy (Ladson-Billings, 1995; Paris, 2012).

Discussion

When it comes to teaching mathematics and science for social justice, many teachers are often unsure how to begin. Social justice issues can be challenging to address in any classroom particularly among teachers who fear being inaccurate, insensitive, or offensive when speaking with their students. One mathematics teacher participant, EP, stated "I wouldn't want to boil it [a social issue] down to numbers and that's all it is, because it's . . . not. I find this offensive." NC also stated, "It's [social justice issues] a very vulnerable thing to talk about in general . . . it needs to be a supportive environment that everyone feels welcome and trusted in." Some teachers might hold a belief that mathematics is neutral and culture free and teaching mathematics exclusively focuses on the computation of numbers and procedural fluency. Others position themselves as having limited knowledge and understanding about how to facilitate teaching STEM for social justice suggesting limited teaching resources available to support culturally relevant or social justice teaching. These beliefs and positions often lead teachers to conclude that exploring social justice issues does not fit well within the mathematics classroom, particularly when the focus is solely on sensitive racial issues or numbers and procedures (Berry et al., 2020; Leonard & Evans, 2012).

It is difficult to envision engagement in STEM learning apart from the application of knowledge developed in the practice of those disciplines. Social justice STEM teaching operates from an equity imperative that all students can achieve in these disciplines. Educators can support their students in the STEM literacy goal of developing scientifically and mathematically savvy citizens who reason and solve problems germane to their sphere of influence. This view of STEM education sees learners as change agents (Freire, 1970), and teachers as guides who prepare learners "for life as socially conscious and active citizens who can use science for personal and community purposes" (Finkel, 2018, p. 41). Leonard and Evans (2012) defined teaching mathematics for social justice as embracing social justice perspectives and actions enabling all learners to engage in cognitively demanding STEM in culturally specific and meaningful ways which support improving the economic and social conditions of marginalized individuals or groups. Marginalized individuals and groups are those who are denied involvement or participation in mainstream economic, cultural, political, or social activities. As such, teaching STEM for social justice involves teachers emphasizing equitable opportunities for *all* students while empowering them to use STEM to understand and critique inequities within *any* community and work to improve or reduce inequitable conditions within those communities.

Scholarly Implications

Strategies for Addressing Topics of Social Justice

As it relates to teaching social justice in education, working with this cohort of in-service STEM teachers brought to the researchers' attention that the initial efforts in summer 2020 to encourage the integration of social justice issues into trauma-informed engaging lessons were insufficient, at best. To support teachers in designing instruction enabling students to apply knowledge to social justice issues, instruction requires considering teaching *with, for,* and *through* social justice; it is not just about lesson development and implementation (Berry et al., 2020; Wager, 2008). Relationship building by teachers with and among students and the dialogue that emerges is as imperative as social justice lessons themselves (Berry et al., 2020). Teacher and student rapport can best be established when teachers first attend to the trauma-informed teaching practice in which they establish physical, emotional, social and academic safety (Carello & Butler, 2015).

In many ways COVID upended the 2020-2021 school year interrupting the typical school year resulting in unexpected changes in planning, teaching, learning goals, and classroom environments that included both face-to-face and online students. Under normal circumstances, teachers are afforded opportunities to engage in explicit lesson planning which includes anticipating students' thinking, misconceptions, and problem-solving strategies. This type of formal lesson planning serves as an explicit road map for how students will interact during the learning process (Smith & Stein, 2011). However, during this atypical school year, teachers experienced balancing *in the moment* social justice teaching with more formalized learning designs tying existing curriculum to social justice issues. For example, teaching in the moment of a major current event (e.g., January 6, 2021, capitol riots) requires teachers to think and act quickly with potentially limited resources, which is different from learning activities designed well in advance within formalized curricular units (e.g., Henrietta Lacks and genetics, digital divide and computer science, self-driving cars and ethics within AI). This was especially difficult for teacher participants who had not seen strong examples of social justice teaching modeled to them in their content areas, particularly in mathematics. This spurred the researchers to provide teacher participants with usable resources. In terms of just-in-time teaching, one teacher participant in the study, KC, noted that on the day the capitol riots transpired, her superintendent provided the entire district with resources all teachers could use in their classrooms the very next day. Another example is the lesson plan generated following the inaugural poem read by Amanda Gorman (e.g., School Library Journal, 2021). These are opportunities for instructional designers to consider the need for just-in-time resources.

Social Justice in the Field of Instructional Design

In the instructional design (ID) field, the bar is often set high in terms of what ID practice *should* encompass. Whether it be attending to Merrill's first principles of instruction (Merrill, 2002) or designing with the characteristics of authentic learning in mind (Reeves et al., 2002), there are many ways to engage and support learners. Yet, noticeably absent from

instructional design principles or guidelines are recommendations to teach with and for social justice. For example, in the 5th edition of the *Handbook of Research of Educational Communications and Technology* (HRECT; Bishop et al., 2020), a comprehensive 900-page document recently released, the term "social justice" is referenced only 11 times in-text. By comparison, digital badges are mentioned 178 times in *HRECT*. Design case(s) are mentioned approximately 250 times. Similarly, in the *Journal of Technology and Teacher Education (JTATE)* Hartshorne and Baumgartner (2020) identified key trends transpiring in 2020, and although *equity issues* were noted as a key trend, the term *social justice* was absent from the article. Why is the term social justice relatively absent in the field of instructional design, especially given the recent and current social and political climate? Why is design for social justice not at the forefront of the field's conversations? These questions should be voiced loudly as faculty educators, instructional designers, and K-12 educators work together to address social justice issues through their work.

Advancing Teacher Practice and Future Research

The results of this study have provided the authors with a great deal of insight into understanding the challenges teachers face facilitating social justice lessons in their classrooms. Evidence suggests cultural dispositions play a significant role in ensuring that teachers' and students' cultures co-construct learning opportunities (Banks et al., 2005). The STEM teachers in this study possess cultural dispositions, which Schussler et al. (2008) defined as "teachers' inclination to meet the needs of the diverse learners in the classroom" (p. 107). However, they faced challenges designing, locating, and engaging social justice lessons in their classrooms. While demonstrating a culturally responsive disposition plays a key role in successfully facilitating social justice teaching, it is not sufficient. To develop a rich understanding of social justice teaching and all that it entails, teachers need deep engagement and sustained support (Wei et al., 2010). STEM teachers cannot simply take an issue of inequality or social justice and connect it to science or mathematics without giving thought to their students' perspectives or lived experiences. STEM teachers need assistance understanding the process of making meaningful connections between their content and issues impacting students' lives and communities. These teachers benefit from additional support in the form of social justice lesson exemplars, PD on classroom community building, and in-classroom training, mentorship, and follow-up support, particularly if technology integration is involved (Kopcha, 2012). The results of this study will benefit all those engaged in STEM teacher education by providing opportunities for further discussion on the critical need to support STEM teachers' development of social justice pedagogy.

The teachers in this cohort expressed a desire for additional support because they felt they were unable to integrate social justice teaching in their STEM instruction to the degree desired. As a result, more work is currently being completed. As faculty scholars, the researchers are leading a support group for this cohort of teachers to design for social justice learning in summer 2021. Six of the seven participants returned for additional collaboration in this area. The researchers' goal is to provide these teachers an opportunity to co-construct knowledge regarding what it means to be socially-just educators, as well as to allocate dedicated time for pedagogically productive talk on social justice teaching in STEM. According to Lefstein et al. (2020), pedagogically productive talk is:

> (a) focused on problems of practice; (b) involves pedagogical reasoning; (c) is anchored in rich representations of practice; (d) is multi-voiced; (e) includes generative orientations toward students, learning, content, teaching, and problems of practice; and (f) combines support and critique, fostering trust and collegiality, as well as critical, problematizing inquiry (pp. 362-363).

By coupling pedagogically productive talk (Lefstein et al., 2020) with deep engagement and sustained efforts to improve instruction and learning (Wei et al., 2010), the researchers' goal is to facilitate discussions on the challenges of teaching for social justice and potential problems that teachers may encounter at their respective school sites. During the COVID-19 pandemic, occasions for teachers to develop and participate in remote and online blended learning opportunities proved beneficial (Safi et al., 2020), particularly when the PD activities were unstructured, offered social connection, and centered on learners (Geiger & Dawson, 2020). The researchers aimed to enable the cohort to create lessons with and for social justice, implement the lessons they designed, and return to the group to describe the successes and challenges faced during lesson implementation and reflect on lesson modifications.

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Appendix A

Exit Interview Questions

1. Previously you defined learner engagement as [insert definition that the individual wrote prior to the summer PD]. Knowing what you know now, would you change or expand your previous definition of "learner engagement"?
2. What edits to that definition might you make?
3. How do you intend to approach learner engagement during online days this fall?
4. What factors will you look for this fall to see if your students are engaged online?
5. What teaching strategies do you plan to use to create a highly engaged classroom online?
6. As part of your Professional Development this summer, you created a project that you shared out to the group during the last synchronous session. Can you describe what you created?
7. What problem were you trying to address through the creation of this project?
8. What new skills or knowledge did you gain this summer that are reflected in the project (e.g., making an instructor screencast video for the first time in order to flip instructional time during sync sessions, creating a collaborative notebook space for your students
9. Within the project you created, what learner engagement strategies did you include and why?
10. Think on the dimensions of learner engagement. [Share Bond and Bedenlier's 2020 chart of learner engagement on screen to aid in recall].What aspects of your project touch on those three dimensions of learner engagement?
11. Do you think you'll share your project with your colleagues at your school? Who might you share it with? How do you hope that they'll use it?
12. **Before** this PD workshop, on a scale of 1 to 10, with 1 being not at all prepared and 10 being incredibly prepared, how prepared did you feel to design and implement instruction for rapid online learning/emergency remote teaching in spring 2020?
13. *AFTER* this PD workshop,on a similar scale of 1 to 10, how prepared do you feel currently to design and implement instruction for online/hybrid learning in fall 2020?
14. What did you learn this summer that impacts your perceptions of your ability to teach in an online/hybrid manner?
15. Has your school shared what the return to school will entail? What are the plans?
16. How will you tackle that approach this fall in your own classroom?
17. What factors, experiences, etc. inform these plans?
18. Face to face teaching this fall may involve socially distancing within classroom (if/when meeting face to face). If students must remain six feet apart, what types of instructional strategies would you like to employ to foster learner engagement in the classroom?
19. How might you enable collaboration in a physical classroom setting even if students are spaced at a distance?
20. What factors, experiences, etc. inform these plans?
21. During the summer PD, trauma-informed teaching practices and social justice resources were shared and discussed. What role do students' experiences during these challenging times play in your instructional decisions?
22. Share on screen the principles of trauma-informed teaching practices to help jog the memory of the Fellows)

- Did you intuitively integrate any *trauma-informed teaching practices*listed here during the spring?
- Have you intentionally made any plans to address any of these this fall?
- If so, what do you plan to do? If not, can you explain why you might not explicitly address it?

1. Since emergency remote teaching ended in the spring, there has been social and political unrest.

- Do you intend to address these issues this fall?
- If so, what do you plan to do/resources you plan to use? If not, can you explain why you might not explicitly address it?

8. Thinking to the fall and potentially the spring 2021 semester, what ongoing supports do you need to feel supported in blended/online teaching?

Appendix B

Follow-up Interview Questions

1. Summarize your teaching context – courses, grade level, and your school's schedule with regard to face-to-face or virtual instruction.

Learner Engagement Defined

2. Previously you defined learner engagement as [insert definition that the individual wrote prior to the summer PD].
3. Based on your teaching this past semester, how would you change or expand your definition of learner engagement?
4. Compare, and contrast emergency remote teaching of Spring 2020 with your teaching in the past semester (fall 2020/ ask again end of spring 2021 semester).

Learner Engagement Strategies

ONLINE

3. How did you approach learner engagement during online days this past semester?
   1. What factors did you look for this fall to see if your students were engaged online?
   2. What teaching strategies did you use to create a highly engaged classroom online?
   3. Considering your fall 2020 teaching context, what successes and/or challenges did you face, to engage your students relative to the Bond et al. framework.
   4. To what do you attribute those successes or challenges?
4. As part of your Professional Development this summer, you created a project that you shared out to the group during the last synchronous session. It attended to a problem that you experienced during emergency remote teaching in spring 2020. You included certain learner engagement strategies to support the implementation of your project.
   1. Did you implement the project that you planned? If so, tell us how it went.
   2. Did the learner engagement strategies that you included in your project map out successfully?
5. On a scale of 1 to 10, with 10 being the highest level of expertise, given your experience teaching online,
   1. How prepared do you feel currently to design and implement instruction for online or hybrid learning in the new semester?
   2. What did you learn through your experiences teaching this fall that impacted your perceptions of your ability to teach in an online/hybrid manner? [*request an example or two*]
      Has your school shared what the return to school will entail? What are the plans?
6. Has your school supported you to engage learners virtually or in a hybrid manner?
   1. Did you receive ongoing teacher training or professional development?
   2. How has your district/school/administrators supported you well?
   3. What could have been improved?
7. Thinking to the next semester, what ongoing supports do you need to feel supported in blended/online teaching?

SOCIALLY DISTANT CLASSROOM

8. In the past semester, what types of instructional strategies did you employ to foster learner engagement in the classroom:
    1. Virtually (if applicable)?
    2. Hybrid (if applicable)?
    3. Face-to-face and socially distant (if applicable)?
        1. How did you enable collaboration in a physical classroom setting even if your students were spaced at a distance?
        2. What factors, experiences, etc. inform these plans?

TRAUMA-INFORMED TEACHING PRACTICES + SOCIAL AND POLITICAL CONTEXT

10. During the summer PD, trauma-informed teaching practices and social justice resources were shared and discussed. At the end of the summer, we discussed how you might address those topics during your fall teaching.
11. Were you able to incorporate any trauma informed teaching practices?
12. b) What did you do and how did it go?
13. Were you able to address social justice issues within your math and/or science instruction at all this fall? [*If the participant proposed action steps in their final presentation, refresh their memory on what they proposed*]
    1. Describe what you did and the frequency of that instruction.
    2. Can you give a detailed example how you designed instruction to support social justice issues?
        1. Did you use any specific resources?
        2. What learner activities did you have the students engage in?
        3. Did students make/create any artifacts of their learning? Can you describe those in detail?
        4. Do you have any teaching artifacts that you are willing to share with us?
    3. What instructional decisions impacted how you addressed the social issues this fall with your students?
    4. How might you address social justice issues with your students in the spring? Why?

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Computing for Communities: Designing Culturally Responsive Informal Learning Environments for Broadening Participation in Computing

Diane Codding, Hui Yang, Chrystalla Mouza, & Lori Pollock

Computational Thinking   Informal Learning   Culturally Responsive   Computer Science

Despite increased attention on promoting access to computer science among all students, female and racially minoritized youth continue to be underrepresented in STEM, often lacking opportunities for computer science due to under-resourced schools and a lack of teacher preparation. As a result, K-12 schools are unable to fulfill the goal of expanding access and broadening participation in computing alone. In this paper, we examine how our university-library partnerships can provide access to computer science instruction while attending to issues of social justice through culturally responsive informal learning design. Findings provide insights related to the design, implementation, and outcomes of informal computing clubs for youth from diverse backgrounds.

Introduction

In recent years, there has been increased attention on promoting access to computer science (CS) among all students. Yet, female and racially minoritized[1] youth continue to be underrepresented in STEM, often lacking opportunities for CS due to under-resourced schools and a lack of preparation for CS teachers (Margolis, 2017). CS careers offer economic opportunities, and our society continues to rely heavily on technology, making it increasingly important to broaden participation in CS (Blikstein, 2018). Additionally, increased diversity brings new and important perspectives to CS careers, which help prevent serious design flaws and produce technologies that better serve diverse communities (Vakil, 2018).

K-12 schools, however, are unable to fulfill the goals of expanding access and broadening participation in computing alone. Rather, informal institutions such as public libraries, community-based organizations, and after-school programs should play an active role in supporting formal school efforts and providing resources potentially unavailable in K-12 classrooms (Kumasi, 2010; Lee et al., 2018). Importantly, efforts to promote CS in both formal and informal

environments should be guided by equity pedagogies—pedagogical approaches that leverage and support students' racial, cultural, and gendered identities to further develop their learning and CS identity development (McGee Banks & Banks, 1995; Madkins et al., 2020; Vakil, 2018). In this paper, we examine the ways in which ongoing university-library partnerships can support efforts to broaden minoritized youth participation in computing through culturally responsive informal learning design that advances student computational thinking (CT)—an approach to problem-solving that draws on fundamental CS concepts.

Informal Learning Design to Promote CT

Although efforts have been made to increase access, CS participants continue to represent a homogeneous group with few females or racially minoritized participants (Master et al., 2016). Research suggests we can address this challenge of inequitable access by promoting local partnerships with both formal and informal learning environments and implementing service-learning programs where carefully mentored undergraduates with a CS background assist local providers using research-based and equitable pedagogical practices (Ericson & McKlin, 2012; Yang et al., 2021). Local partnerships between universities and libraries can serve to promote computational thinking (CT) and expand access to rigorous CS instruction by engaging diverse populations and leveraging students' sociocultural backgrounds (Maloney et al., 2008; Summers & Buchanan, 2018). CT skills are fundamental to participation in computing—they help students learn to address real-world problems like a computer scientist by breaking down complex problems (decomposition), identifying trends (pattern recognition), focusing on relevant details (abstraction), and developing sequential instructions to solve problems (algorithm design). Although scholars argue that CT is an essential analytical skill for 21st century citizens (Wing, 2006), minoritized youth frequently lack opportunities to develop CT skills effectively through the creation of computational artifacts (Repenning et al., 2015).

Libraries are unique learning environments, which have reinvented themselves in response to 21st century needs by offering a variety of low-tech and high-tech activities intended to improve computational skills among youth in their communities (Myers, 2009). In fact, libraries have started to generate interest as designed learning spaces that seek to develop and enact programs that engage youth in computing (Lee et al., 2018). Nevertheless, research documenting the ways in which university-library partnerships can help promote youth CT knowledge and CS identity development is sparse (e.g., Yang et al., 2021). Some prior work on introducing programming in libraries aimed at identifying the types of resources that could be used to foster CT learning (Bilandzic, 2016; Koester, 2014). However, prior studies did not examine how to design effective learning environments that honor the backgrounds and experiences of minoritized youth while addressing design challenges associated with out of school efforts to broaden participation in computing.

A Culturally Responsive Approach

Traditionally, research in CS education has relied upon cognitive orientations to learning at the expense of sociocultural and situated perspectives (Grover & Pea, 2013; Vakil, 2018). Our work takes a culturally responsive approach to designing informal learning environments for the purpose of broadening participation in computing, particularly among females and minoritized youth. Specifically, we seek to offer accessible and culturally responsive CS programming in partnership with local public libraries, where youth can develop their CT knowledge, skills, and identities. Taking a culturally responsive approach is important for engaging minoritized youth in CS by designing a program that leverages their sociocultural identities and promotes a sense of belonging in the field of CS. Our approach draws on theoretical foundations related to the design of learning environments with an emphasis on sociocultural perspectives (Falk & Storksdieck, 2005) and culturally responsive frameworks (CRF) (Gay, 2000; Ladson-Billings, 1995; Paris, 2012; Pollock, 2008; Scott et al., 2013, 2015).

In this work, we utilize four specific strategies aligned with CRF: (1) research-based CS practices for teaching and engaging a diverse population of youth (e.g., pair programming where two programmers work together on a single computer); (2) practices that build on the knowledge and assets of communities (e.g., valuing collaboration over individualism); (3) undergraduate CS students as facilitators and near-peer mentors; and (4) culturally responsive interactions between facilitators and youth underrepresented in CS (e.g., relationship building, positive behavior

management, anti-deficit views of minoritized youth and communities, commitment to valuing youth's funds of knowledge) (Codding et al., 2019; Yang et al., 2021).

A key objective of our culturally responsive approach is the design of informal learning environments that help youth develop positive computing identities and foster a sense of belonging within the field of CS. An individual's computing identity is shaped by their experiences with CS (Goodenow, 1993), and constantly reevaluated based on their interactions with others (Goldston & Kyzer, 2009). Computing identities are culturally situated and intersectional (Goode, 2010), because individuals experience CS in classed, gendered, and racialized ways (Livingston & Sefton-Green, 2016; Rodriguez & Lehman, 2017). A sense of belonging is informed by how an individual perceives their acceptance, respect, inclusion, and support (Goodenow, 1993). If students lack a sense of belonging, it negatively impacts their motivation, psychological well-being, and connection to the space (Maestas et al., 2007). If students develop a strong sense of belonging in CS, it can help them to overcome self-doubt and persist in their study of CS (Veilleux et al., 2012). Facilitators can increase belongingness by interacting with students in a culturally responsive and affirming way that acknowledges, values, and incorporates students' cultural backgrounds, identities, and knowledge (Pollock, 2008). Additionally, female and racially minoritized facilitators are uniquely positioned to adjust expectations of who can become a computer scientist (Friend, 2015).

Purpose

In this paper, we examine the ways in which ongoing university-library partnerships attend to issues of design through CRF to support youth participation and CT learning. Specifically, our work is guided by three interrelated objectives. First, we investigate challenges related to the design of informal learning environments for CS learning and present the decisions facilitators made to address those challenges. We focus on design challenges specifically because of the unique flexibility, voluntary attendance, and drop-in nature of youth participation in informal settings, which makes it difficult to design cohesive offerings and anticipate outcomes (Lemke et al., 2015; Martin, 2019). Second, we examine how these decisions reflect the facilitators' positionality and use of CRF to facilitate culturally responsive interactions and create an affirming learning environment. Third, we provide a reflective analysis of how design decisions have influenced the implementation of our informal computing program and shaped youth experiences. Our analysis is shaped by the following research questions:

1. How are facilitators implementing CRF to identify and address challenges while designing informal learning environments that support the development of youth CT skills?
2. How does facilitator positionality inform the process of designing informal computing programs?
3. How do facilitators' design decisions grounded in CRF shape youth computing experiences?

Methods

Context

This work is situated in a larger effort to broaden participation in computing through a three-pronged approach: teacher professional development, a college field-experience course, and sustainable partnerships (Pollock et al., 2015). In this paper, we focus on the latter two strategies. The field-experience course, facilitated by the authors, combines college classes with field-experience in formal or informal settings. The class meets weekly to discuss CS pedagogy (including equitable pedagogy), identify and implement CS teaching resources, write and model CS lessons, and reflect on experiences. In the field, groups of undergraduates meet with educators weekly to plan CS lessons, lead activities, and facilitate after-school programs. Although participants do not intend to pursue teaching careers, they enroll in the course with a desire to share their CS expertise with others and to strengthen their technical communication skills (Mouza et al., 2016; Mouza et al., 2020).

This paper examines two such partnerships between undergraduates and public library staff members. The *Scratch Technology Club* (STC) is facilitated in partnership with Library A and serves a community that is 72% White, 9% Black, 9% Asian, and 7% Latinx. The *Coding Club* (CC) is facilitated in partnership with Library B and serves a community that

is 35% White, 38% Black, 6% Asian, and 21% Latinx. While these programs serve different populations of youth, they share a similar mission; they both seek to support youth through CRF as they develop CT skills and a sense of belonging in computing. Table 1 illustrates the specific computing tools and CT concepts selected and taught by the program facilitators at both libraries. As part of the partnerships, the public libraries provided resources and logistical support.

Table 1

Computing Tools and CT Concepts

Category	STC	CC	Concept Description/Example
Technologies	Makey-Makey	Makey-Makey	Electronic invention kit that can turn everyday objects (e.g., bananas) into computer keys
	Finch Robots	Finch Robots	Programmable robot
	Ozobots	Ozobots	Programmable robot that can identify lines, colors, and codes
	Scratch	Scratch	Block-based programming platform for creating interactive stories, games, and animations (scratch.mit.edu)
	Tinkercad		3D modeling program for turning designs into 3D printable models
		PencilCode	Collaborative programming site for drawing art, playing music, and creating games (pencilcode.net)
CT Concepts	Loops	Loops	Scratch programming blocks such as "repeat # times," "forever," and "repeat until" that allow for repeated execution of code
	Variables	Variables	Manipulation & modification of data
	Sensing	Sensing	To detect different factors of project such as color
	Conditionals	Conditionals	If-Then Statements
	Operators		To script math equations using Boolean blocks such as ( ) < ( ).
	Broadcasting		Messages that are used to communicate with multiple sprites

Each program is designed and facilitated by undergraduates with the support of library staff. Any youth interested in participating were permitted to attend, though many had no prior experience with CT. Table 2 provides an overview of the STC and CC programs during the two semesters of this study. During Semester 1, CC held two additional sessions as a pilot program specifically targeting a group of high school youth from nine different charter schools, which all utilized the library as a bus stop. Participants in these pilot sessions were primarily Black and female. In Semester 2, CC was relaunched to target the bus-riding youth after the successful pilot program.

Table 2

University-Library Partnership Programming

Semester	Program	Format				Participants	
		Sessions	Length	Total	Frequency	Ages	Attendance
S1: Fall	STC	10	2 hrs	20 hrs	Saturdays	7-15	5-7 youth
	CC	5	1 hr	5 hrs	1st & 3rd Tuesday	8-15	5-7 youth
		2 (pilot)	1 hr	2 hrs	2nd Tuesday	13-16	6-8 youth
S2: Spring	CC	7	1 hr	7 hrs	Tuesdays	14-18	4-5 youth

Participants

STC and CC were facilitated by undergraduate CS students from the authors' Research University and a State Technical College (*N*=9). Table 3 provides demographic information for facilitators. The Research University students (*n*=7) participated in our field-experience course, which included three 45-minute culturally responsive training sessions led by the lead author. During the first session, facilitators were introduced to culturally responsive pedagogy and learned to

adopt affirming attitudes toward youth from culturally diverse backgrounds (Ladson-Billings, 1995). During the second session, facilitators engaged in an activity to take inventory of their own intersectional identities and reflected on the student populations they were working with in the field. Facilitators also received a list of culturally responsive strategies, such as focusing on positive behaviors and expecting their students to do their best while giving them support and tools to do so. During the third session, facilitators discussed the importance of taking a personal interest in each of their students and reflected on their shared interests in order to develop rapport and guide design. This session focused on helping facilitators deepen their sociocultural consciousness to promote equitable and inclusive CS education (Pollock, 2008). The State Technical College students (*n*=2) worked as library interns and were introduced to our culturally responsive approach during a one-hour orientation meeting prior to serving as CC facilitators.

Table 3

Facilitator Demographics

Semester	Facilitator	Program	Gender	Race	Year	University
S1: Fall	Carrie	STC & CC	Female	White	Sophomore	Research University
	Jose	CC	Male	Latinx	Sophomore	Research University
	Kathy	STC	Female	White	Senior	Research University
	Nancy	CC	Female	White	Sophomore	Research University
S2: Spring	Anthony	CC	Male	Black	Sophomore	State Technical College
	Chloe	CC	Female	White	Freshman	Research University
	Logan	CC	Male	White	Freshman	Research University
	Mark	CC	Male	White	Senior	Research University
	Yasmine	CC	Female	Black	Freshman	State Technical College

Youth who attended CC in Spring were invited to participate in a focus group. Out of the 25 youth who attended at least one CC session during Semester 2, nine agreed to participate in our study. Table 4 provides demographic information for participating high school youth (*N*=9).

Table 4

Focus Group Demographics

Race	n	Gender	n	School	n	Grade	n	Attendance	n
Black	5	Female	7	Charter	4	9th	4	1-2 sessions	5
Latinx	3	Male	2	Military	5	10th	4	3-4 sessions	1
White	1					11th	1	5-6 sessions	2
								7 sessions	1

Data Collection

Data were collected from multiple sources each semester. In the Fall, data were collected from three sources: (a) facilitators' weekly reflection journals (*N*=40); (b) facilitators' end-of-program reflections on content and pedagogical decisions (*N*=4); and (c) detailed field observations of all sessions of CC and STC to ensure the reliability of the data set (Hatch, 2002). In the Spring, data were collected from three sources: (a) individual interviews with program facilitators (*N*=5); (b) focus groups with youth participants (*N*=9); and (c) detailed field observations of all sessions of CC.

Weekly Reflection Journals. Facilitators were required to reflect upon their teaching experience at the program every week. In their reflection, they needed to briefly report the implemented lesson components (e.g., learning activities, covered CS concepts) as well as their reflections about their teaching, including what went well in their lessons, what

did not go well, as well as questions that they had during their teaching. The length of their weekly journal entries ranged from 200 to 400 words.

End-of-Program Reflection. Facilitators were required to provide a holistic end-of-program reflection as they completed their field teaching experience. The requirements of this reflection included asking the facilitators to provide anecdotes or evidence about how their teaching had changed throughout their 10-week teaching experience, such as comparing their pedagogical approaches at different time points throughout their teaching experience. The average length of the end-of-program reflection was about 700 words.

Facilitator Interviews. Following the final session, facilitators participated in semi-structured, 30-minute interviews, during which they answered approximately nine questions about their experiences facilitating CC (e.g., *What were some of the challenges of facilitating CC at Library B?*), their knowledge and perceptions of youth participants (e.g., *How would you describe the strengths youth brought to CC?*), and their motivation for becoming a facilitator (e.g., *What influenced your decision to become a facilitator?*). Interviews were audio recorded for transcription.

Youth Focus Groups. Youth were invited to participate in one of two focus groups following the final session. Participants were asked seven questions about their experiences with and impression of computing following the program (e.g., *How comfortable are you with Scratch programming? Could you see yourself taking computing classes at school?*). Focus groups were audio recorded for transcription.

Data Analysis

To address the first research question, reflection data were analyzed using a combination of open coding and *a priori* developed during a previous study of 80 weekly journal reflections to identify challenges faced by instructors and decisions to address those challenges (Yang et al., 2019). Two researchers first went over the coding scheme to redefine the categories using several journal reflections (Table 5) and subsequently coded the data from each program based on the updated coding scheme.

Table 5

Reflection Journal Coding Scheme

Category	Sub-Category	Definition
Challenges	Diverse Learners	Learners' diverse background with programming, skills, interests, and culture.
	Uncertainty of Participants	Unknown participation rates for weekly sessions
	Limited Resources	Limited physical resources (laptops) and human resources (support)
	Learner Engagement	Issues related to learners' content knowledge – returned learners mixed with new learners
Decisions	Addressing Personal Factors	Decisions related to learners' personal characteristics which support a successful learning experience (e.g., prior knowledge, sociocultural background, experience with CS, motivation)
	Addressing Sociocultural Factors	Decisions related to collaboration, use of tools, and culturally responsive relationship development

To address the second and third research questions, interview and focus group data were analyzed with a focus on understanding how facilitator positionality and CRF impacted participant experiences and learning environment design. Observational data were used to triangulate findings. Our analytical approach was inspired by grounded theory (Glaser & Strauss, 1967) and open coding was used to develop a coding scheme from emergent themes (Strauss & Corbin, 1990). Themes fell into two overarching categories: (1) the influential aspects of facilitator positionality, which included their personal experiences with CS education, computing identity, and positionality; and (2) the impact of CRF design decisions, which included curriculum design, building trust, and promoting a sense of belonging within CS and the library.

Results

Identifying and Addressing Design Challenges within CRF

Our first research question examines how facilitators are implementing CRF to identify and address challenges while designing informal learning environments to support the development of youth CT skills. Findings from reflective journal data provide insights into how facilitators implemented CRF in the design and implementation of informal computing programs for youth from diverse backgrounds.

Informal Learning Design Challenges

Facilitators discussed four types of challenges while considering learning environment design. The first challenge focused on designing a learning environment that helped *all* youth, independent of their background, develop CT knowledge and skills. Carrie documented these challenges after her first week at STC: "After teaching one class, I have learned that the greatest challenge with teaching in a library setting will be catering to the needs of all students."

The second challenge focused on varying participation rates among youth, ranging anywhere from zero to ten participants. For instance, the facilitators of both clubs were never sure which youth would be in attendance. Moreover, new youth joined every week with varying degrees of CS background knowledge. Such transitional participation made it difficult to plan activities and prepare equipment to meet the participants' needs.

The third challenge, limited resources, often worked in combination with the second challenge. This resulted in facilitators raising concerns about how to balance and maximize effectiveness: "This week we had the highest number of students with a total of 12, so students had to share laptops and tools which is why we had them work in pairs" (Kathy, STC). Facilitators also faced challenges associated with support from library staff, due to limited knowledge in computing. Although facilitators initially anticipated supporting library staff in the delivery of computing programs, expectations changed after meeting with the staff. Jose (CC), explained: "Ms. B is not equipped to run the program due to IT not being her area of expertise and other responsibilities she has at the library. This meant that [we] have to step into the leadership position and run the program."

The fourth challenge was a culmination of the first three. With continually new and diverse learners, ongoing uncertainty of participation, and limited resources, facilitators found it challenging to engage youth in the learning activities: "When explaining the basics of Scratch, many of the returning students were bored and didn't want to pay attention, while some of the new students struggled" (Carrie, STC).

Addressing Challenges with CRF Grounded Decisions

Throughout the programs, facilitators applied CRF while making decisions, which included both content and pedagogical considerations, based on personal, sociocultural and physical factors.

Personal Factors. As facilitators' knowledge of participants developed, so did their ability to make reflective and engaging decisions addressing personal factors. Facilitators frequently collected participant feedback through observations and conversations, modifying their plans based on youth engagement and feedback from the previous week. CC facilitators learned that their participants enjoyed friendly competition: "We did a Finch maze with the high schoolers, making it complicated with thin lanes and twists and turns. The kids had a lot of fun coding their robots and we timed them individually against their friends. They got really competitive with it and continued to edit their code to make their robots beat previous times" (Nancy, CC). Participants used masking tape to create their own Finch maze on the carpet with passages wide enough to navigate their Finch robot through the maze (see Figure 1).

Considering most youth lacked prior CT knowledge, facilitators sought to make CT concepts engaging and relevant. They provided youth with knowledge and skills to construct personal, meaningful artifacts and helped them establish a linkage between CT concepts and their applications. Carrie (STC) noted, "This is a good lesson plan because it relates algorithms to things they can easily understand, like the steps they take to get ready in the morning. This lesson also uses a fun activity, making paper airplanes, to engage students." Facilitators carefully weaved the tools and CT

concepts (Table 2) with participants' interests and real-life applications into a lesson design, such as incorporating the idea of using robotics in serving food at school cafeterias.

Sociocultural Factors. With participants from diverse backgrounds, facilitators promoted a socially interactive and collaborative environment, allowing peers to communicate, share personal meanings, and construct learning together. To accomplish these goals, facilitators utilized collaborative learning. Kathy (STC) explained, "We had each student work with a peer to create their final scratch project. They had to include certain features that we have taught them over the semester . . . All the students were familiar with performing these tasks but the difference in this project was they had to create a sprite for themselves and their partner. They also had to interact with their partner, ask them what they like to do, and include it into the project."

Participants often brought new friends or family to the club. Youth were frequently observed talking, sharing, and helping each other. Facilitators leveraged these sociocultural factors to increase attendance and engagement. Nancy (CC) explained, "I was worried that the high schoolers wouldn't want to come to the program, as I'd been told [by the librarians] that they always said no when asked to come to the coding club, but after [we] convinced one girl to come, about five others followed." In this example, it is clear that facilitators recognized social capital as one of the many assets youths brought to CC.

Additionally, facilitators designed an affirming learning environment that encouraged culturally responsive interactions between facilitators and diverse participants. This can be observed in Jose's (CC) reflections about his communication skills. He stated, "I believe that becoming a better instructor goes beyond having the knowledge in my head and involves a lot of communication skills that make or break my effectiveness as an instructor." In a later reflection, he expanded on this desire for effective and affirming communication: "I am now more aware of the language and tone I use when talking to the kids because of the impact my words have on their takeaway and experience with [the] computer coding club" (Jose, CC).

Physical Factors. Program facilitators frequently rearranged the physical settings to create a more effective learning environment and maximize participation. Lacking space and resources, Kathy and Carrie decided to rearrange the room to better facilitate participants testing their Finch Robot programs. They divided participating youth into two groups and assigned them a carpet and tape to create mazes. Groups then worked to code their Finch Robots to complete the mazes (Figure 1). CC facilitators also addressed physical factors while seeking to expand participation by building Finch Robot mazes in the hallways to attract new participants and increase engagement.

Figure 1

Participating Youth Divided into Two Groups Collaborating on Finch Robots
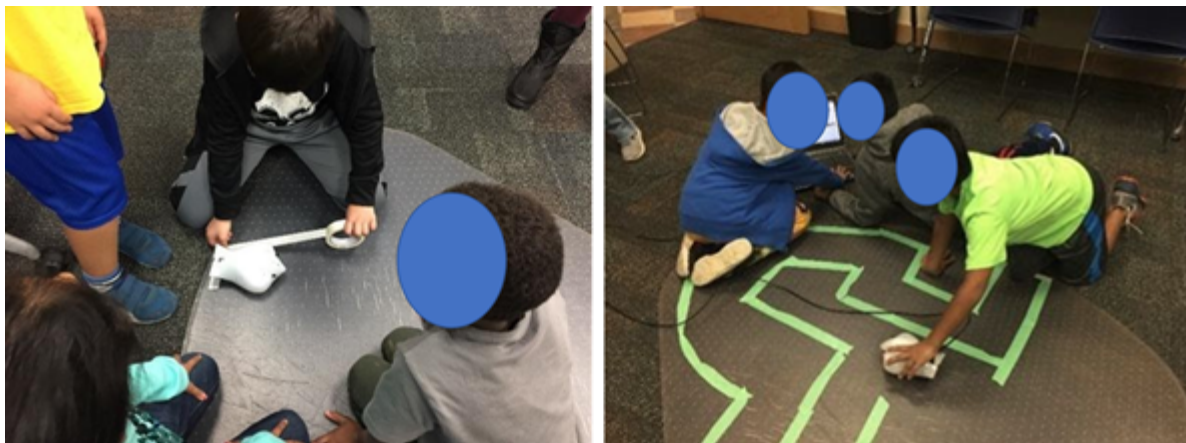
(Photo 1) A group of three elementary-aged students watch as a fourth student uses masking tape to create a maze on the floor for their Finch Robot.

The Role of Facilitator Positionality in the Design of Informal Computing Environments

Our second research question examines how facilitator positionality informs the process of designing and adapting informal computing programs. Findings revealed that facilitator positionality helped to establish affirming, near-peer relationships with participants and situated facilitators as advocates for expanding and diversifying participation in computing. Facilitators drew from their own experiences with CS, computing identity, and positionality while designing the learning environment and connecting with participants. Anthony (CC) focused on cultivating youth interest in CS, because his own interest had "fizzled out" when he was younger. His goal as a facilitator was to keep youth participating in CC each week and pursuing CS in their formal education. Anthony used his own computing identity to connect with and inspire youth. Similarly, Chloe (CC) chose to become a facilitator in hopes of inspiring youth to become interested in CS at a younger age than she had. Chloe was not exposed to CS at school or through informal programming. Instead, she first discovered coding while watching a movie with her father, which led her to begin exploring it on her own. Like Anthony, Chloe uses her own computing identity to make connections with and motivate youth during CC.

Facilitators also leveraged their positionality to connect with youth over shared identities. Female and racially minoritized facilitators were aware of the ongoing homogeneity in CS, a field that continues to be dominated by white males. Female facilitators like Chloe used their gender identity to disrupt the stereotype of CS as a male-oriented field: "I feel like if you can get younger children, especially girls, to get into those fields it will shift the field to a different perspective in the near future" (Chloe, CC). Black facilitators also leveraged their racial identity to connect with youth and highlight the importance of increasing racial diversity in CS. Having seen the limitations of CS within racially minoritized communities, Yasmine (CC) emphasizes the importance of increasing diversity in CS as a way to ensure equitable access to the benefits of technological advancements. Yasmine explains that diversifying CS would address inequities, such as soap dispensers that fail to recognize hands with darker skin: "If they had someone with darker skin helping with the design, then the soap would've come out."

The Role of CRF Design Decisions in Shaping Youth Experiences

Our third research question examines how design decisions, grounded in CRF, shaped participating youth experiences in the informal computing environment. Findings indicated that by implementing CRF, facilitators were able to design engaging activities for diverse populations of youth, provide a space where youth could experience a sense of belonging, and build trust with participating youth and librarians.

Designing Engaging Activities. Facilitators used research-driven and equity-based practices to promote engagement in computing activities (Madkins et al., 2020). These practices included hands-on collaborative activities, project-based learning, tiered activities, community projects driven by student interest, CS Unplugged (i.e., activities that teach computing concepts in kinesthetic ways away from the computer), and paired programming. Facilitators used hands-on collaborative activities to help youth build their confidence in computing: "I think it's a way for kids to be introduced to something they might not be introduced to, that is going to have a large impact on the future" (Anthony, CC). After participating in CC, youth self-reported that they felt highly confident (80% to 90%) in their computing abilities and they could see themselves continuing to study CS in their formal education. Facilitators also reported seeing an increase in youth confidence over the course of the semester-long program. During the focus groups, youth also identified hands-on and creative learning opportunities as one of their favorite features of CC, such as remixing a Mario themed Scratch game to be controlled using bananas and a Makey-Makey. Creativity and tiered activities helped facilitators adapt to new groups of participants each week. Chloe found that such strategies helped facilitators to "spread [CS] out to the community more, since it is more of a communal building rather than a school." The youth also emphasized the fact that CC was unlike school due to the hands-on activities, welcoming atmosphere, and positive relationships with the near-peer facilitators.

Building Trust. Facilitators leveraged culturally responsive interactions with youth (Pollock, 2008) to increase student engagement and promote a sense of belonging. Prior to joining CC, many of the bus-riding youth did not feel welcome

within the library. The librarians warned us about their tense history with these youth during our first planning, describing them as unruly "monkeys" who needed to be "pulled down from the trees." This casual use of a racist stereotype reflects a lack of cultural understanding among library staff and highlights the need for a justice-centered approach to CS programming that challenges their deficit view of the bus-riding youth (Vakil, 2018). Participating in CC helped youth experience a sense of belonging within the library and rebuild their relationship with the librarians. Anthony sought to make CC a place for participating youth to have fun, pushing back on the idea that libraries are reserved for quiet reading and homework. Facilitators sought to change the atmosphere and expectations of the space by personally inviting youth to participate, acknowledging the youth's desire to socialize and relax after school by frequently joking and laughing together. Further, facilitators frequently helped youth with their homework, talked to them about college, and bonded over shared interests. Through these activities participating youth began to trust the facilitators and turn to them as near-peer mentors. Additionally, the facilitators gained the trust of librarians, who began to change their perception of the bus-riding youth.

Designing a Space to Belong. The facilitators succeeded in designing CC as a space where youth could experience a sense of belonging and community within the library. During focus groups, youth reported that their favorite part of attending CC was spending time with the undergraduate facilitators. Facilitators who shared underrepresented gender and racial identities with participating youth were able to leverage their near-peer relationships to promote engagement in CS activities. Chloe (CC) developed a strong bond with the female participants: "We had good conversations every time they came. And I think they were just excited to see me come back every week." White male facilitators reported having a harder time connecting with the youth, who were primarily Black and female. However, this did not prevent facilitators from getting to know the youth. Logan reported successfully getting to know the youth by helping them "get their own perspective" and interests into their projects. One student who was initially unenthusiastic about coding, spent several weeks developing a Harry Potter themed game that showcased her knowledge of quidditch and wizardry: "I loved making my game. . . . I loved my Harry Potter game" (focus group). Facilitators intentionally designed CC to be a welcoming space, where youth could engage with computing at their own pace and bond with facilitators over shared interests.

Discussion and Implications

Our university-library partnerships attend to issues of educational equity through culturally responsive informal learning design. Specifically, we address issues of access by attending to personal, sociocultural, and physical factors in our computing programs. The challenges we uncovered in this study are not necessarily unique to our programming. For instance, the issue of uncertainty in participation has been well-documented in the literature (Martin, 2019) and can be addressed through the design of activities with multiple entry points as well as activities that allow students to go deeper in their interests (Ito et al., 2013). Yet findings indicate the need to help facilitators *anticipate* these challenges in advance and create plans for addressing them. For instance, future professional development opportunities for university facilitators should more explicitly address challenges associated with the (a) drop-in nature of youth participation; (b) diverse backgrounds of participants in informal settings both in terms of sociocultural identities, content knowledge, and interests; and (c) availability of computing resources in each setting. Such opportunities should also connect facilitators to existing resources, including curricular materials as well as pedagogical strategies that help differentiate CS tasks based on youth background knowledge and personal interests.

To increase access, we apply CRF to help youth develop a sense of belonging in both the informal learning environment and in the field of computing. These frameworks include leveraging facilitator identity to promote positive, near-peer relationships with female and racially minoritized youth. Therefore, intentionally recruiting racially minoritized and female facilitators is an important part of promoting diversity in computing. Those most at risk of being left out are youth who do not regularly see themselves represented in the field, specifically female and racially minoritized youth (Valenzuela, 2017). Therefore, facilitators from underrepresented backgrounds can, and should, serve as role models for youth as they envision their future selves (Penuel et al., 2019).

Informal learning environments are uniquely situated to prioritize learner-centered and interest-driven computing opportunities (Penuel et al., 2019; Yang et al., 2021). While STC and CC facilitators prepared lesson plans and thoughtfully selected activities to engage their specific participants, some of the most engaging moments happened outside of the curriculum, such as a carefully designed Harry Potter-themed game. Applying CRF to informal environment design requires constructing CS curricula that are culturally relevant and rigorous (Madkins et al., 2020), yet flexible enough to allow youth to bring in their own interests and identities into their computing projects (Yang et al., 2021). Therefore, facilitators should be encouraged to design curriculum and pedagogical approaches that reserve space for student interest, choice, and creativity in order to allow their learning to reflect more of their own identity and interests within the context of CS.

While CC facilitators were able to engage bus-riding youth in CS programming despite early warnings from the librarians, our programming did not do enough to permanently alter the racially-charged relationship between the librarians and the Black bus-riding youth. In future cycles of our university-library partnerships, we hope to expand our culturally responsive training to include additional space for engaging librarians in the important work of addressing biases, stereotypes, and deficit views in order to reshape the library as a positive learning environment and promote a sense of belonging among youth, especially Black youth, within the library. In Vakil's (2018) vision for a justice-centered approach to equity in CS education, he envisions "homelike learning environments" in which "learning is organized in ways that seamlessly honor the depths of student experience and the range of identities they carry with them into the learning and design process" (p. 44). In order to make this vision a reality, our university-library partnerships need to expand our culturally responsive approach to address systemic racism and cultivate an affirming learning environment.

Limitations

There are two limitations associated with this work. First data were collected only from a small number of facilitators and participating youth. Therefore, results may not reflect the views and experiences of all participants. Second, this work did not examine youth outcomes in terms of CS content knowledge or identity development. Rather, the focus was on the manner in which equity pedagogies were taken up by facilitators and the ways they shaped youth experiences. We agree with Madkins et al. (2020), however, that future research needs to consider the effectiveness of equity pedagogies in CS learning, interest, and engagement using both proximal and distal measures.

Conclusion

In this paper, we provide evidence on how program facilitators, with support from university faculty and librarians, regulated and adapted the design of the library clubs. Findings of this study provided insights related to the design, implementation, and outcomes of informal computing programs for youth from diverse backgrounds. This work is significant for creating a foundation for culturally responsive approaches to designing informal learning environments for broadening participation in computing. This foundation will lay the groundwork for creating community partnerships that promote equitable access and making computing relevant to youth from underrepresented communities. Further, this work helps establish the importance of community partnerships for designing culturally responsive and equity-focused computing programs. Looking forward, we hope to determine how the cultural context of each library impacts the culturally responsive decisions necessary to increase student engagement and to design an affirming learning environment.

Footnote

[1] The use of the term 'minoritized' considers that majority or minority status of certain groups does not always match numerical representation. It reflects a concern with capturing actions and processes through which certain racial/ethnic groups are subordinated or denied equitable opportunities (Shields et al., 2005).

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With Our Community, for Our Community: Expanding Possibilities for Engaging in STEM

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We examine shifting perceptions of STEM for Latinx teens involved in a "Community STEM" environment. This design shows promise in broadening the definition of science and leveraging expertise of STEM-underrepresented youth. However, these programs are still not typical and merit further investigation. Therefore, we examined a Community STEM project where Latinx teens addressed local noise pollution. Teens documented sound levels, created graphs and maps, presented to stakeholders, and built acoustic panels. Researchers employed an ethnographic perspective, identifying science-relevant roles and artifacts. Artifacts became focal points, promoting reflection on noise pollution, potential solutions, and roles in the project and community.

Introduction

Although equity scholars have worked tirelessly to improve minoritized students' experiences with science, a great amount of work remains (Bang et al., 2012; Freeman et al., 2009). Unfortunately, with the focus on passing high stakes tests, elementary teachers tend to prioritize language arts and math (National Research Council, 2012), while afterschool programs devote more time to homework and test prep rather than science enrichment (Freeman et al., 2009). Additionally, educators both in and out of school report they lack the training and resources needed to enact high quality science instruction (National Research Council, 2012; Freeman et al., 2009). One potential response is the Community STEM model (see Nation & Hansen, 2021), which is grounded in partnership between researchers, afterschool staff, and community members and draws heavily from the work of equity scholars in science education (Fusco, 2001; Calabrese Barton et al., 2013; Birmingham & Calabrese Barton, 2013).

The community STEM model integrates science with engineering and other disciplines in ways that are meaningful to participants, contextualizing learning within community and environmental issues. Although youth participate in elements of citizen science such as real-world data collection, analysis, and dissemination, the project is conducted in partnership with community members rather than relying on them solely for mass data collection. Students

authentically contribute to the design of the project, and new questions arise that move them toward more complex investigations, usually to learn about and improve their local environment. Students research their surroundings and then build their own devices or structures, requiring integrated STEM where they participate in scientific practices like carrying out investigations and engineering design practices like designing solutions. These projects show promise in broadening the definition of science and leveraging expertise of youth from STEM-underrepresented groups such as girls and students of color (Birmingham & Calabrese Barton, 2013; Calabrese Barton et al., 2013). However, due to time, funding, and training constraints, as well as limited views on what disciplinary science means, these programs are still not typical in schools or afterschool science. More research is needed to consider patterns of participation in these novel learning environments and characterize how they can support engagement.

Therefore, we examined a year-long Community STEM project at an afterschool center in an unincorporated area of Central California. Fifteen Latinx teens participated by discussing their community's noise pollution issue and recording decibel readings to document and map sound levels. A subset of the teens created graphs and maps, and presented them to community stakeholders. Then they documented sound levels in their afterschool center and created acoustic panels for their study room. Three researchers employed an ethnographic perspective and performed thematic coding on video and audio records of sessions, individual and group interviews, and student artifacts. We utilized Figured Worlds framing (Holland et al., 1998) to explore the spaces of the teens, and how these worlds outlined norms for participation and recognition in science. We asked:

- What roles did the teens take up?
- What science identity artifacts were produced, and what were their meanings?

This work documents the experiences and identity processes of a group of Latinx youth and adds to an emerging body of research on Community STEM environments. The paper has implications for research and practice, elevating the voices of Latinx youth as community scientists and change agents and documenting the dynamics of a Community STEM learning design.

Literature Review

People who identify as Latinx are the largest minority group in the U.S. (Census Bureau, 2018); however, they remain underrepresented in STEM degrees and fields (National Science Foundation, 2017). To compound the problem, there is a dearth of research documenting the experiences of Latinx students in STEM. Studies tend to focus on predicting degree attainment instead of illuminating interest in or reasons for studying STEM (Crisp & Nora, 2012). More research needs to focus on documenting the supports, obstacles, and experiences of Latinx students in STEM. In particular, despite being the most underrepresented group in STEM, "few researchers have attempted to understand how women of color perceive and experience science and mathematics" (Crisp & Nora, 2012, p. 7). The available research on Latinx women points to the importance of a personal connection or role models in science (Beeton et al., 2012; Sorge et al., 2000), and recognition by others as a science person (Carlone & Johnson, 2007). Factors such as family support and institutional advocates are crucial as well (Crisp & Nora, 2012). However, barriers to participation include lack of awareness about science careers, financial constraints, low expectations from others, and lack of relevance or views of science as "a white male profession" (Beeton et al., 2012, p. 72). By middle school, Latinx young women are "the least likely of any group to have STEM career aspirations" (Crisp & Nora, 2012, p. 7).

Critical scholars argue that to confront these barriers and shift Latinx students' perceptions of and participation in STEM, we must redefine what it means to do science or be considered good at science. Conventional school science privileges Eurocentric knowledge, meaning the ways that students from non-dominant communities think about and participate in science are often dismissed or considered inadequate (Bang & Medin, 2010; Mensah & Jackson, 2018). Instead, we need to shift power dynamics and create expansive learning experiences that leverage and legitimize diverse ways of being in science (Kang & Nation, 2021). Afterschool contexts could be a strong starting point for this shift towards equitable science, since their flexibility allows programs to incorporate diverse ways of knowing, blur disciplinary boundaries, and promote exploration in STEM and skill-building opportunities relevant to STEM careers

(Afterschool Alliance, 2015; Krishnamurthi et al., 2014). Community STEM programs, incorporating authentic making and citizen science practices for social justice ends, can broaden young people's definition of science and value the cultures of underrepresented students while encouraging them to explore new science-related interests and identities (Calabrese Barton & Tan, 2010; Varelas, 2012). To better understand these complex out-of-school science environments and associated identity processes for girls and students of color, we utilize the Figured Worlds model, described below.

Theoretical Framework

The Figured Worlds model is a large-scale cultural model (Holland et al., 1998) that has been widely used in educational research (Urrieta, 2007). The figured world refers to a "socially and culturally constructed realm of interpretation" (Holland et al., 1998, p. 52), and provides a lens for understanding how people within the "world" take on dynamic roles, are recognized by others in ways that define their participation, and place value on certain outcomes (Holland et al., 1998; Urrieta, 2007). People create and maintain figured worlds with others, co-producing artifacts, activities, discourses, and performances and ultimately outlining norms for participation and recognition in that realm (Gonsalves & Seiler, 2012; Holland et al., 1998). Individuals are socially identified and offered certain positions, such as "good student", and author a response that negotiates their position (Urrieta, 2007). Certain ways of talking or doing become recognized and either repeated or rejected, leading to circulation of cultural practices (Wortham, 2006).

The figured world framework has been used extensively to understand the authoring of science identities (Urrieta, 2007; Varelas, 2012). By studying learners as participants in figured worlds, researchers can uncover the local norms of doing science, and understand how definitions of science and science people are established (Rahm & Gonsalves, 2012). Figured worlds can be "as if realms" where people create new ways of being and doing and ultimately new worlds through "the arts and rituals created on the margins of regulated space and time" (Holland et al., 1998, p. 272). Using the "as if realm" framing from figured worlds could provide insight into the new territory of Community STEM programs. The figured world as a "site of possibility" is pertinent in the context of our new program blending science, social action, and art. The figured worlds framing therefore provides insight into both how the culture of science is defined and shifts in new settings, as well as how youth take on new identities in these settings. While frameworks like culturally responsive education provide overarching framing and instructional approaches for science instruction (valuing students' experiences, home languages, and ways of knowing and speaking), they fall short of providing insight into the process of redefining the culture of science and what it means to be a science person.

Given the Figured World framework, identity is made visible through what people do and how that is interpreted, "by the resources they access and activate to do so, and by how they position themselves in relation to others and to the object of the activity while taking particular roles" (Calabrese Barton et al., 2012, p. 43). Identity processes take shape as social performances (Gonsalves & Seiler, 2012), where people engage in a process of "becoming" based on their performances and others' recognition (Carlone & Johnson, 2007; Stapleton, 2015; Urrieta, 2007). These performances or ways that people "figure" themselves in specific contexts become "roles" (Holland et al., 1998, p. 41), which can be momentary stances or longer interactional sequences that shape local ways of being (Bucholtz & Hall, 2005). Over time, momentary stances and roles shift into longer-term habits and patterns, which can cement into "itineraries of identity, or well-worn ideological routes along which socially positioned subjects may be compelled to travel" (Bucholtz et al., 2012, p. 157).

Discourse, roles, and artifacts communicate socially and culturally constructed ways of being; therefore, they are "living tools of the self" that influence how people experience the world (Holland et al., 1998). In the context of Community STEM projects, student work such as video clips, data representations, blogs, or artwork are artifacts from particular moments in time that provide snapshots of how youth are positioning themselves and authoring their identities. Researchers can use how underrepresented students talk about these "identity artifacts" to consider how they engage with science, including taking on shorter-term roles and longer-term identities not typical in a science class (Calabrese Barton et al., 2008). Identity artifacts taken from different points in time provide insight into how identities shift, yet stabilize across different social contexts and over time (Calabrese Barton et al., 2012). Following Calabrese Barton's work, we identify "signature science artifacts" (p. 81), as well as focus on the roles, resources, and associated

discourses of participants. Examining and elucidating these science artifacts and surrounding discourse provides an alternative view on science competence and expertise in comparison to standardized testing or grades, and can be especially impactful for understanding nondominant ways of doing and thinking that might not be counted in traditional science classrooms.

Methodology

Project and Participants

Data were collected at the Teen Center, an afterschool site that provided bilingual programming for over 50 Latinx youth in grades 6-12. Fifteen Center youth participated in our Community STEM project from February 2017-February 2018. They surveyed residents and determined that sound pollution was a commonly reported issue, especially for Latinx families. Teens discussed the sound issue, proposed guidelines for collecting data, and recorded decibel readings across town to determine sound levels. Youth recorded during group data collection days and on their own time according to the collectively devised guidelines. Seven participants (three male, four female) analyzed data and presented their findings to community stakeholders at a Town Hall. At the Town Hall, this "data analysis team" also introduced a community maker project, inviting residents and other attendees to make acoustic panels to decrease sound levels in the Center homework room. Participants conducted pre-post-tests of sound levels and analyzed data to determine a statistically significant reduction in reverberation after installing the sound panels.

Four girls (Katie, Jatalia, Araceli, Flora) and three boys (Rafael, Tomás, and Dylan) self-selected into the data analysis team. Katie, Araceli, and Flora were in 7th grade, Jatalia was in 10th grade, and Rafael, Tomás, and Dylan were in 11th grade. Participants reported varying levels of success in school, but an overall aversion to science courses, especially ones involving math or bookwork. They all demonstrated competence and performed well in science and engineering activities at the Center, but did not view themselves as scientists or engineers and did not feel that others saw them that way either, demonstrating low "STEM identity" (Carlone & Johnson, 2007).

Table 1

Demographic Information for Each Participant

Participants	Ethnicity	Grade level	Grade in science (self report)	Identity within project
Araceli	Latina	7	B	Scientist
Dylan	Latino	11	D	Community scientist
Flora	Latina	7	B	Helpful data analyst
Jatalia	Latina	10	C	Community scientist
Katie	Latina	7	A	Designer
Rafael	Filipino	11	A	Scientist
Tomas	Latino	11	A	Scientist

Procedures

Our approach was both adaptive and emergent, starting with aligning goals of researchers and Teen Center staff, co-executing the planned steps, reflecting on the progress, and adapting to emergent circumstances in planning next activities. There was already an established relationship between the researchers, staff, and youth, and a figured world that was being continually constructed; therefore, we started the Sound Project by explicitly connecting to past activities of participants. The youth had designed and distributed surveys of community members and learned that noise was one of the most pressing issues for both college students and families. We framed the project as a continuation of this, to collect more data to examine where and when it was loud. We introduced the idea of public or community science where members of the community participate in scientific studies. After introducing the project, the researchers outlined a process of scientific investigation as 1) introduction and planning, 2) data collection, 3) data

analysis, and 4) presentation to the public. After the presentation of findings from collecting sound data, the focus shifted to devising a solution in the form of acoustic panels. We followed the engineering design process of 1) identify the problem 2) explore solutions and make a model 3) build and test designs 4) improve on designs.

Project activities occurred twice a week for around two hours per session. Certain big events such as the introduction to the project, group data collection, Town Hall presentation, and installation of sound panels were more formal sessions and included all project participants (See Table 2). Other activities were more flexible with youth arriving and departing throughout the timespan and choosing if they wanted to participate and on which part. All work was conducted at the Teen Center except a few group data collection days where youth surveyed their neighborhood in teams, and individual data collection which occurred outside of Center hours and was sent to the facilitators. Data analysis sessions were more flexible since there were fewer participants, and often there were multiple activities occurring simultaneously with different facilitators and youth.

Table 2

Overall Timeline of Sound Project With Participation Type and Date per Activity

Dates	Session topic/activity	Participants
February 2017	Introduced project	Whole group
March 2017	Tested measurement app on participants' smartphones	Whole group
March 2017	Discussed initial research design	Whole group
April 2017	Collected data (in groups during afterschool sessions and individually out of this time)	Whole group + individuals
May	Analyzed data (answered research questions, made graphs)	Data analysis team
May	Built interactive map of the town with sound recordings	Data analysis team
June 2017	Presented at Town Hall to community members	Whole group
June 2017	Identified problem of noise in the study room	Data analysis team
June 2017	Test acoustic panel prototype	Data analysis team
June 2017	Decorated and shaped sound panels, designed layout	Whole group
July 2017	Installed sound panels in homework room	Whole group
Aug-Sep 2017	Post tested acoustic panel (1st trial), installed panels	Data analysis team
January 2018	Reinstalled panels, repeated pre and post test	Data analysis team
February 2018	Analyzed data from pre and post tests of room with acoustic panels	Data analysis team

Data Collection and Analysis

The research team led activities and took ethnographic notes on the design process and implementation challenges, tracing dialogic exchanges and multimodal practices across time (Green et al., 2012). In developing findings, we examined video and audio from 21 activity sessions of 1-2 hours each, and four group exit interviews. The research design was a qualitative, ethnographic case study, or "an intensive, holistic description and analysis of a single instance, phenomenon, or social unit" (Merriam, 1998, p. 27). The case was bounded by the place and the project duration, referring to the group of youth who participated in the Teen Center's year-long afterschool project to investigate, report on, and address sound levels in their homework room and broader community (Yin, 2003). We focused our analysis on the group of seven youth participants in the data analysis team. For our sub-unit of analysis within the overall case (Yin, 2003), we focus on a "key event", or dialogue that occurred while working on a signature science artifact, to understand how participants were recognized and responded in relation to science tasks.

In Phase 1, we utilized methods from interactional ethnography (Green et al., 2012) to construct minute-by-minute event maps for each session, illustrating participant actions in a timeline (for more detail, see Nation & Duran, 2019). We then directly inscribed codes onto video to identify important components of Figured Worlds including *participant, role*, *physical tool*, *digital tool*, *artifact*, and *science practices*. We listed roles, tools, and object artifacts for each session,

then performed semantic analysis (Spradley, 1980) to list all artifacts produced and forms of engagement with science throughout the project. Participants produced 33 object artifacts, including soundwave data displays, geotagged sound clips, vlogs, guideline lists, data spreadsheets, graphs, maps of the homework room or whole town, individual acoustic squares, and group acoustic panels. In exit interviews, participants listed 14 artifacts (Table 4) as particularly impactful, commenting about memorable or enjoyable activities. We next determined "signature science artifacts" (Calabrese Barton et al., 2012, p. 81) for each participant based on their comments and others' comments in the exit interview, and the amount of time and engagement level while participating in each activity from their event maps.

In Phase 2, *positioning events* were identified based on participants' evaluative and affective responses which communicated their "stances" (Bucholtz & Hall, 2005). These events were momentary interactions which occurred as part of normal participation within the project activities. We identified an event whenever a participant verbally responded to another participant or facilitator when interacting with a project artifact. These events were directly inscribed onto the video with timing noted. We examined the intersection of the signature science artifacts and positioning events by creating a code relations matrix in MAXQDA, which revealed the co-occurrence of codes. When an overlap was identified, this was considered a *key event*, and we transcribed dialogue to produce retrieved segments of coded video with transcripts for all dialogue about the signature science artifacts. These key events were added to participants' event map timelines. We then coded whether the participant accepted, rejected, or negotiated the position offered to them during this key event, and if this constrained, supported, or expanded their perspectives on science. After examining events and responses for each participant in chronological order, we documented patterns of how they shifted in the way they perceived themselves or others perceived them. Additionally, to triangulate findings on perceptions of self in relation to STEM, two researchers performed emergent thematic coding of the interview transcripts to identify project roles and associated actions.

Results

Our analysis revealed that the project shaped participants' interpretation of what constituted "Community STEM" and what it meant to be considered science people. Artifacts used to examine sound levels, report findings, and enact change were important to mediating this transformation. The roles of *scientist/science person, community scientist, maker, organizer, engineer, leader, presenter, data team member*, and *general member/helper* were discussed in interviews and triangulated in video coding (see Table 3). Roles were associated with distinct practices and tasks often linked to creating or improving different artifacts. In the next section, we present in broad strokes the social types or roles of *community scientist, scientist, maker, engineer, data team member,* and *presenter*. We illustrate what it meant for participants to affiliate (or not) with these subgroups and the associated practices. Then, we describe in depth the significant science artifact for two participants, considering these artifacts and associated discourses to be "living tools of the self" (Holland et al., 1998, p. 28). Examining these artifacts and participants' responses over time provided insight into identity processes and shifting perspectives on science.

Roles

Most participants distanced themselves from the conventional roles of scientist, science person, or engineer; however, they were more likely to relate to roles such as maker, community scientist, or helper (See Table 3). Terms like "scientist" and "engineer" were associated more with school and jobs. Therefore, the role of scientist or engineer was constrained by how well participants were doing in these subjects at school or their enjoyment of science class tasks such as note-taking or memorizing key terms. In contrast, youth found diverse ways to characterize a maker, including sub-roles such as designer or helper. Data team member and presenter were sub-roles associated with community scientist. These roles were associated with specific data analysis and communication practices required to carry out and share results from the investigation. Community science and making were mentioned as ways to contribute to something important and make a difference, whether building panels to reduce noise or raise awareness of sound pollution on a neighborhood level.

Table 3

	Maker	Engineer	Science Person	Community Scientist	Data Team Member	Presenter	Leader	Helper	Organizer
Araceli	√	√	√	√	√		√		
Flora	√				√			√	
Jatalia				√	√	√		√	
Katie	√	√	√	√		√			√
Dylan	√			√	√	√		√	√
Tomás				√	√	√		√	√

Interestingly, being a "community scientist" was considered separate from being a "science person" or "scientist." Although almost everyone felt they were a community scientist, only Araceli and Katie felt like science people. In comparison to other roles, being a science person was associated more with school and specific knowledge or tasks. According to our participants, scientists knew how to code, do experiments, read, think and write. Most of our participants did not feel very confident in or enjoy their science classes at school. Only Katie and Araceli felt like science people, because they were able to code, build, and experiment. Tomás did not comment much on this, but Dylan mentioned feeling competent at science content even though he was not a science person and had failed his science and statistics classes. Flora and Jatalia were very adamant about not liking science and not considering themselves as science people.

In contrast, everyone except Flora felt like community scientists. Katie defined community science as "doing a project that could help, or make something better in your community. And in general just being a scientist, but, doing projects, experimenting and stuff." Dylan also mentioned the scientific process yet focused on community needs with his definition. He reported that a "community researcher is a person who collects data, analyzes it, and makes a conclusion. And community because we did it with our community for the community." Although most of our participants did not personally feel like science people or scientists, they recognized that they engaged in scientific practices with the goal of improving their community, and therefore were able to embrace the role of community scientist or researcher. The exception was Flora, who equated community scientists with public servants, felt that she had not done enough to earn this title. When asked if she considered herself a community scientist she responded, "Not really, I don't think I made a big difference. I don't know who I would consider a community scientist. Maybe like police or something? Like help control fires or something?" However, she answered that a community scientist "means they do research of how to help the community in different ways" and agreed when the researcher asked if she had helped the community during the project. She also stated, "I feel we did a really good job on it. I think we really succeeded on it . . . Because it actually did help." Similarly, Tomás reported that participating in this project, "made us feel like we actually did something." Dylan added that he felt "a sense of awareness in the end. Because for people who don't know what it's like to live in [our town] and sometimes like what these problems are. It sets up a visual of the problem and some people can see it." Community science was a way to actively participate in addressing a local issue, by collecting data and raising awareness of the issue.

The broad goal of collectively addressing a community problem, which did not have a set outcome, enabled each member to carve out a space in the project and participate in unique ways. Despite taking ownership over different parts, everyone participated in some type of making and some type of data analysis, and either identified as community scientists or expressed similar motivations of addressing the noise issue. Araceli, Katie, and Flora described how they were makers, which was associated with the amount of time they spent on decorating and installing the panels. In comparison, Tomás, Dylan, and Rafael sometimes left decorating activities to focus on data collection or analysis and overall spent much less time on making. Sometimes the boys felt uncomfortable if the focus was on "decorating" rather than building and testing models or analyzing data. From the beginning they took up the label of data analysts, but as the project shifted into making and engineering design they were unsure how this related to their roles as analysts. They worried that the maker activities were too juvenile for them as upperclassmen in high school, felt uncomfortable when mostly girls were doing the activity, and believed that making extended beyond their prescribed role as data analysts.

Although everyone except Katie considered themselves part of the data team, the boys were more likely to refer to themselves as data team members. From the beginning of the project, the boys referred to themselves as the "data group" or "analysts", and usually responded positively to facilitators labeling them as "data team members." On the other hand, the girls were more likely to reject labels of "analyst" or "scientist", and took a few months to feel a part of the data team and develop ownership over project artifacts. Flora and Jatalia initially told friends they were "just helping" the facilitators, and Katie, in particular, distanced herself from the label of data collector/analyst or part of the data analysis team. Although Katie started with the core group, after the first few sessions she decided she did not want to collect or analyze data and instead focused on other parts of the project such as documenting other people's work and creating the acoustic panels. Katie reported that, "I never actually did the data thing because I didn't want to . . . Because it's boring. And because I don't want to walk around everywhere . . . But I did like three." Even though she collected a similar amount of data points when compared to other participants, she minimized her contribution as well as expressed distaste for the role. She also did not feel like part of the data analysis team, and chose not to help create the graphs or map. Despite this, she mentioned learning similar things about using the app and measuring sound levels as well as "how to calculate and gather information from [our data]."

Katie, Flora, Jatalia, and Dylan had all failed STEM tests recently or had teachers express doubt in their science or math abilities. In response, Katie and Jatalia avoided math-related Sound Project activities, while Flora and Dylan countered facilitators' statements about their science skills by bringing up school failures or other perceived inadequacies. Participants dismissed being characterized as "real scientists"; however, they recognized they were performing science and math practices relevant to what they had covered at school, and acknowledged that the facilitators took them seriously in their roles as scientists. Even though only Katie and Araceli considered themselves science people and engineers, by the end of the project participants were more open to considering these possibilities in the future. For Dylan and Jatalia, this shift was due to realizing that science could be "for the community" instead of research conducted on their communities. For Flora and Katie, they discovered new ways of doing STEM, in particular about the engineering design process and what designers and engineers do. For example, Flora, Araceli, and Katie expressed interest in learning more about engineering after the project and even applied later that year to a high school engineering academy. Katie felt pride in being recognized as "the designer" of the overall pattern for the acoustic panels, and felt engineering was a possibility since she enjoyed problem solving and art. Flora was initially motivated by helping the graduate facilitators in any capacity; however, this shifted to helping her community in general as she worked through the data and better understood the project and its goals.

Artifacts

For each participant we determined a significant science artifact (see Table 4) which mediated the thoughts, feelings, and actions of themselves and others. Araceli's significant artifact was the collection of sound clips she recorded on her phone which allowed her to document the noise problem. For Jatalia, it was the interactive sound map she created for families, which displayed sound effects around town. Katie was motivated by the wall acoustic panel with everyone's individual contributions of acoustic squares yet her overall design. Even though Flora also felt strongly about the acoustic panels, her significant artifact was the sound wave print outs because they allowed her to determine that the acoustic panels were successful in dampening the noise in the homework room, making their work valuable.

Tomás' artifact was a graph of sound levels according to the day of the week and time of day. For Dylan, the graphs were also important. However, he felt more strongly about presenting the PowerPoint slide with overview information because it helped him conceptualize the project and the meaning of their findings. For Rafael, it was the slide with the top three loudest and quietest sounds which represented that the town could be loud but also a peaceful place. The boys' significant artifacts were all data displays, produced from data analysis tasks. In comparison, the girls had a greater diversity of significant artifacts ranging from sound files to acoustic panels. The girls were also more likely to have positioning event responses coded as constraining or expansive rather than supportive, potentially indicating greater shifts in their views of themselves in relation to science. This slower process, with more moments not directly supporting their ideas of science, provided the rationale to highlight the artifacts and associated identities of the girls.

Table 4

RQ2: Signature Science Artifacts according to Participant

Participant	Signature Artifact	Participant Reflection	Artifact Mediation
Araceli	Sound clips recorded on phone app, geotagged and with decibel information	"We just go around [our town] and just like use the app and also like . . . we just recorded with an app. Yah and see and collect all the data to see how much loud or quiet it is."	Sound clips served as documentation of the noise problem, which Araceli related to personal experiences with loud music and neighbors. Collecting the sound clips was an opportunity to explore the neighborhood and connect with friends.
Flora	Print outs of amplitude over time in pre and post conditions, used to estimate reverberation time	"I learned how it worked and how it made a big difference in the room . . . like how it absorbed sound."	Sound print outs mediated participation in a group analysis activity and invited Flora's individual perspective which was valued by the group; the resulting data from the print outs were viewed as useful to the Teen Center.
Jatalia	Map of town with linked audio, to click on nine areas and hear representative sounds	"It was fun to hear all the data and point the map out and everything . . . It kinda impacted me because I didn't really realize how [our town] could be peaceful. I didn't know there's streets or like this side of [our town] is quieter than this side."	Analysis of the data and construction of the map mediated Jatalia's generation of insight on the patterns of noise in the community, which were seen as a valuable information source for community members.
Katie	Individual decorated acoustic squares installed on plywood and mounted to wall to form large panel	"I'm not sure what the difference is with the acoustic panels. I mean, to me it seems the same they're like decoration on the wall. I guess it could work, if it is I'm not noticing it. The panels worked out good because like people did it."	The design for the overall layout for the panels presented a challenge for Katie to construct and assess for effectiveness. Investment in the construction was based mostly on aesthetic value rather than solving the noise issue, and yielded surprise and satisfaction upon successful outcome.
Dylan	PowerPoint slide with information about the project in general and overview of data analysis	"The presentation, yeah it was pretty cool. Overall because it had all of what we did together, and when the presentation was going on, I kind of remembered every single thing we were doing. So that was definitely the part I most remember because it reminded me of everything."	The descriptions and analysis of the sound issue as presented on the presentation slides were viewed by Dylan as a resource for the community; construction of the slides was seen as a collective achievement.
Rafael	PowerPoint slide with top three loudest and quietest sounds and description	"There's like different locations that we have recorded and that there's also traffic and parties and the decibels range from 27 to 108. We wanted the loudest sounds but we also wanted to record the quietest sounds to show that [the town] could be a quiet place, a peaceful place."	The formatting of findings as presented were place-based insights about the quality of sound in the community and allowed for reasoning about the source of sounds, and viewing Rafael's town in new, positive ways.
Tomás	Graphs of sound levels according to the day of the week and time of day	"We definitely made like graphs and information for other people to use, and like maybe other people can use in studies and stuff like that."	Graph construction on detailed sound information was seen by Tomás as a useful scientific resource and a step to future study.

Signature science artifacts. While we analyzed artifacts and positioning events for all youth on the data team, we focus on Jatalia and Flora to provide more in-depth examples of positioning events as evidence of the role of the artifact and surrounding discourse in shaping their participation. We discuss associated identity processes over time, including the girls' view of themselves in relation to STEM.

Jatalia the community scientist. For Jatalia, the project and her signature artifact of the map (Figure 1) offered an opportunity to develop new identities. Working on the map and linking the sound effects gave Jatalia an excuse to come to the center regularly, and made her feel important to the project. In her exit interview she stated that her role changed over time because at first she was peripheral to the project but by the end she was expected to come as part of the data analysis team. She explained that other group members would text her saying, "Jatalia, you should come to this science thing because [the facilitator] wants you to come" and that made her feel included and motivated her to come regularly. She felt "recruited" into the figured world of community science at the Center, and she began to take ownership over the map as she personalized it.

Figure 1

Map of Town With Linked Sound Effects Collected by Participants

Visual of a map with linked sound effects

Preparing her presentation notes for a Town Hall provided the opportunity to reflect on why the project and the map were important to her. When asked for her reasoning for the map, the facilitator helped Jatalia articulate why this was important to her:

> Facilitator: Like, okay, yah displaying the data, talking about the research, actual sound levels. But, like, what is the purpose of it? Why would that matter? Would it happen?
>
> Jatalia: Why . . . ? Because it's, just by looking at it you can see like you don't have to like zoom in to see. ((Pointing around map, gets closer to it, squinting))
>
> Facilitator: Okay, how would this help someone who was moving to [the town]? Like let's say I'm a family and I want to move here with my family.
>
> Jatalia: Don't. I'm just kidding. ((Laughs)) It's like to move closest to like the quiet area.
>
> Facilitator: Exactly.
>
> Jatalia: ((Writes on paper. Puts pencil down, claps then drums table triumphantly))

In the Town Hall presentation, she expanded on this idea of the groups' work benefiting families. She stated:

> What we hope to happen in the future, our next steps are we want to go out and get more data points . . . We want to display data as maps of [town] sound levels, physical or digital. We hope in the future to show on a map where there was the loudest noise and the quietest noise. For example if you are like a family, one who moved to [town], and you want to see where it's quietest and we are hoping later in the future we can have maybe like a red color where it's like the loudest and like quietest would be like blue.

She explained in the exit interview that she felt the map was unfinished and she planned to continue collecting data to make the map more accurate and in particular to highlight loud, party areas for the local Latinx families to avoid. She said, "I feel like the goal of the project was just to spread awareness about the sounds of [the town] . . . it's not always loud it has its moments when it's quiet and it's peaceful it's like [the town] is not a bad place." She wanted to make sure their data was useful, as an accurate depiction of the noise problem and as a resource for Latinx families to find ideal areas to live.

She also recognized the importance of community members collecting, analyzing, and disseminating this information. She explained that, "A lot of people come in and do science" but it was uncommon for it to be done by Latinx

community members like her. She felt that Latinx families rarely benefited from scientific investigations by outsiders because the research questions were not relevant to the immediate community, or because the findings were not disseminated. Community members as researchers offered a way to change power dynamics for Latinx residents who were a minority group living in a "college party town" composed primarily of university students. As both community members and researchers, the data team could ask questions about their concerns such as noise pollution, and share their knowledge of quiet and loud areas to benefit local Latinx residents. Although Jatalia recognized the value of the team practicing community science, it took until the end of the project for her to articulate an identity as a community scientist. In the exit interview, the facilitator asked if she thought of herself as a community scientist after she defined the term. She replied, "Now that I realize, yah."

However, this new identity as a "community scientist" did not influence her view of herself as a science person. When asked if she was a science person, she answered, "At the moment, not really", and that "they think that I don't like science at school." She felt that science at school was "just really boring" and that the community science done at the Center was "different in a good way" and "if only science was so easy like this in school I think I would pass any day." Although she used tools like excel and PowerPoint, collected data and conducted experiments, and presented her findings, applying similar scientific knowledge and practices to school science, her view of herself as a science person did not change as it was connected to school and not the project. While the narrative of "bad student" in science persisted, she was able to take on a new identity as "community scientist." She felt valued in the project for her contribution, and proud of her potential to help local families in the future.

Flora the helpful data analyst. Similar to the map for Jatalia, the sound wave printouts offered Flora the chance to engage with science in a new way that she found empowering and relevant to her community (See Figure 2). She realized that she could combine science with service through testing the sound panels, and at the end commented that, "I feel proud that I helped, that I helped in this project because it was very useful." Her favorite part of the project was "the sound panels because I learned how it worked and how it made a big difference in the room . . . like how it absorbed the sound."

Figure 2

Pre (Top) and Post (Bottom) Sound Wave Printouts That Show Amplitude Over Time, or Reverberation Time
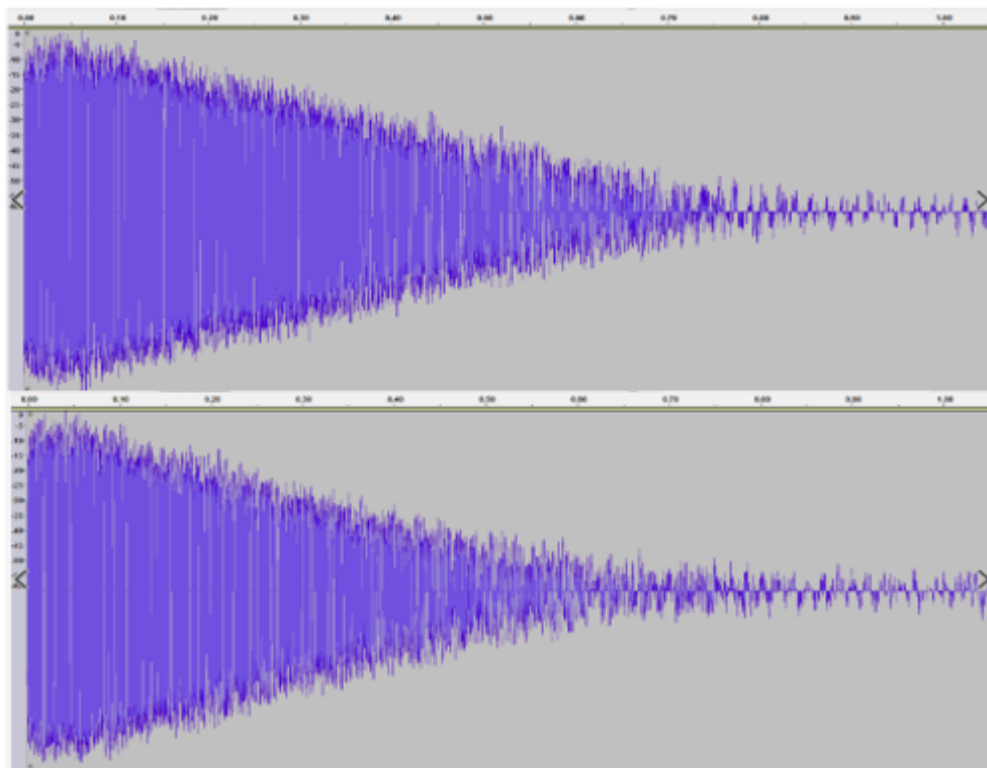
Picture of soundwave printouts

Flora felt helpful because she worked on a successful project, but also because she was positioned as a data team member and performed as a conventional scientist. She was given a position of relative power on the data analysis team. Initially the facilitators taught Flora how to estimate the slope and x intercept of the sound waves to determine the reverberation time, or the number of seconds until the test sound was inaudible in the homework room. After providing feedback on the first one, Flora and the two facilitators each performed analysis independently but side-by-side, with the co-facilitator saying, "Alright, let's do a couple right now . . . I'll do this one." Beyond working at the same pace as the adults on the analysis, her ideas and concerns were taken seriously. When calculating the pre-test mean, she pointed out an intercept data point that was much larger than the others and together Flora and the co-facilitator verified it was an error. In another instance, Flora was positioned as an authority figure as she provided advice and helped the lead facilitator analyze an anomalous data point. In other cases she was engaged in real-time problem solving with adults, including participating in complicated discussions with science vocabulary including "maximum amplitude" and "exponential decay". She also contributed authentically in confirming that the panels were successful. She determined that it was a success due to the differences in the pre and post means, and announced, "it did work" to which the co-facilitator responded, "we proved it, it was a success."

Despite feeling empowered through the data analysis, Flora regularly commented that she was bad at science and rejected the position of "scientist" or "community scientist" offered by the facilitators. She commented that she disliked her science class and teacher, felt it was useless, and made comments such as that she was "probably going to fail this week's test." She had accepted the narrative that she was bad a science and not a good student in science class, even though she recognized she had applied what she learned that year in school about how to conduct an experiment and use excel to calculate averages. Her distaste for school science transferred to the science activities at the Center, and at the beginning she expressed surprise that the community science work was still science since it felt different than what she had done before. After initially reviewing the pre-post data for the sound panels she exclaimed, "Sciiiiience! This is science!" to which the facilitator said, "This is science. You're a citizen or community scientist." However, Flora replied, "Uhhh. Not the best one." Flora saw how science could be relevant and authored a science self which connected science practices with her valued identity of helper. By assisting the data team, and by proving that the overall project

was useful, she was helpful on multiple levels and felt successful. However, while she realized connections between science class content and the project, and felt competent as a data analyst and a helper, she still did not see herself as a "scientist" or "science person."

The figured world of Community STEM functioned as a new world of science possibilities for our participants, centered on playful, artistic, personalized activities that differed from the science they experienced in school. The program supported students developing expanded views of STEM, positioned them as co-learners with adults, and provided ample choices for activities and roles. Participants were able to find personally meaningful reasons to participate and explore deeply given their interests in specific artifacts.

Artifacts played a significant role in presenting possibilities and constructing identities. Araceli used sound clips to relate to different aspects of the project, and develop confidence in her skills as a scientist while documenting the noise problem. Jatalia's sound map displayed the data but was also a potential resource for families like hers. The acoustic panel for Katie both united individuals' contributions and positioned her as the overall designer. Flora's analysis of the sound wave print outs demonstrated the success of the acoustic panels and proved to her and others the value of her contributions. Rafael, similar to Jatalia, felt empowered as a community scientist. He found meaning in creating a list of sounds for the map, and reported at the Town Hall on areas that were relatively quiet and peaceful and argued against oversimplifying the town and its problems for families. Tomás and Dylan felt proud of their graphs and presentation slides because they depicted their findings as data analysts. They also recognized their role in overseeing and synthesizing findings from the collective effort of their peers in the project. Overall, the artifacts required longer-term participation with peers and facilitators, becoming focal points and promoting reflection on the noise problem, potential solutions, and their role in the project and larger community.

Discussion

While many challenges remain for science educators, the community STEM model appears promising for supporting afterschool educators in providing more complex science tasks which build science-relevant skills and identities. According to their exit interview reflections, our participants developed dispositions other researchers have documented in relation to making or community science projects such as resilience and creativity (Sheridan et al., 2014) and decision-making and "optimism coupled with realism" (Schusler & Krasny, 2008, p. 274). Additionally, the long-term nature of our Community STEM project, coupled with the complexity of an authentic scientific investigation, encouraged participants to develop unique roles and expertise within the project. Similar to Ballard and colleagues' (2017) findings, our project promoted diverse roles and practices in order to accomplish the data collection, analysis, and communication. Participating in the data analysis and presentation were compelling to participants as they viewed themselves as authentic contributors. Additionally, the flexibility of the project allowed for new roles that might have initially seemed unrelated to science. Expanded forms of participation are especially relevant to Community STEM programs, as these are "as if" worlds of imagination, play, and discovery at the margins of preexisting figured worlds of science (Holland et al., 1998; Kane, 2012).

In order to achieve these new "as if" worlds, program designers and educators need to be thoughtful about the design of projects. Grounded in the literature and findings from this project, we propose that projects need to be long-term with authentic scientific and engineering tasks, allow for multiple entry points, and arise from an equitable power structure with community partners (Nation & Hansen, 2021). Previous research on youth-oriented citizen science indicates that students thrive in projects where they contribute to real data analysis and dissemination (Heggen et al., 2012; Purcell et al., 2012; Ballard et al., 2017; Roche et al., 2020). Our findings aligned with this, as participants had the strongest association with roles like "data analyst" and "community scientist." Additionally, the authentic context created unique roles that needed to be filled to achieve the collective goal, which meant participants felt needed. Setting goals of presenting at a Town Hall or revealing the acoustic panels provided an authentic audience and a clear timeline. Projects focused on addressing an authentic problem in partnership with community members can help students to take on unique roles and develop expertise linked to both science and community activism. An equitable research-practice partnership meant elevating the rich knowledge that practitioners, youth, and community members bring. Youth

responded differently when they knew our activities and project direction shifted based on their input and comments like Jatalia's revealed the importance of feeling essential to the project. Additionally, they were able to see how science could take different shapes from what they saw in the classroom, as the project work was interdisciplinary, collaborative, artistic, and community-oriented.

Our project opened the range of expression for science identity to include many diverse roles, but while constructing new identities as "community science experts" (Calabrese Barton et al., 2013), most of our participants did not see themselves as "real scientists" or "science people." This potentially contradicts findings from other Community STEM or citizen science programs that encouraged more students to pursue science by breaking down stereotypes about what it meant to be a scientist (Trautmann et al., 2013). It is worth further consideration how to bridge science in school as a type of subject matter to the real-life application of science. Given that Latinx students tend to have lower self-efficacy and view themselves as less competent in school science and math compared to White students (Crisp & Nora, 2012), how can afterschool contexts construct counternarratives that are meaningful within school and beyond? Although programs can open up the range of possibilities to practice science, it is worth exploring the meaning of these identities if they do not transfer to other contexts, and if students continue to feel excluded from the figured world of school science.

Still, participants constructed intersecting identities as Latinx youth, scientists, and community members that seemed richer than traditional school science as defined by being good at certain tasks like memorizing or taking notes. Artifacts were helpful in highlighting the "multiple sites of self" (Holland et al., 1998, p. 28) and the intersection of identity and power. Jatalia and Dylan were motivated by helping local Latinx families, who were sometimes not privy to the research dissemination or related decision making by university or researcher investigations, as low-income immigrant residents and non-college students. They recognized the relevance of their intersecting identities as local residents and Latinx youth while constructing new identities as community scientists and activists. All of the youth had stories about the noise issues and the power dynamics of loud college students and children trying to study or parents needing to get up early for work. Their intersecting identities, including minority status, motivated many individuals from the data analysis team to participate in project activities and produce community science artifacts.

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